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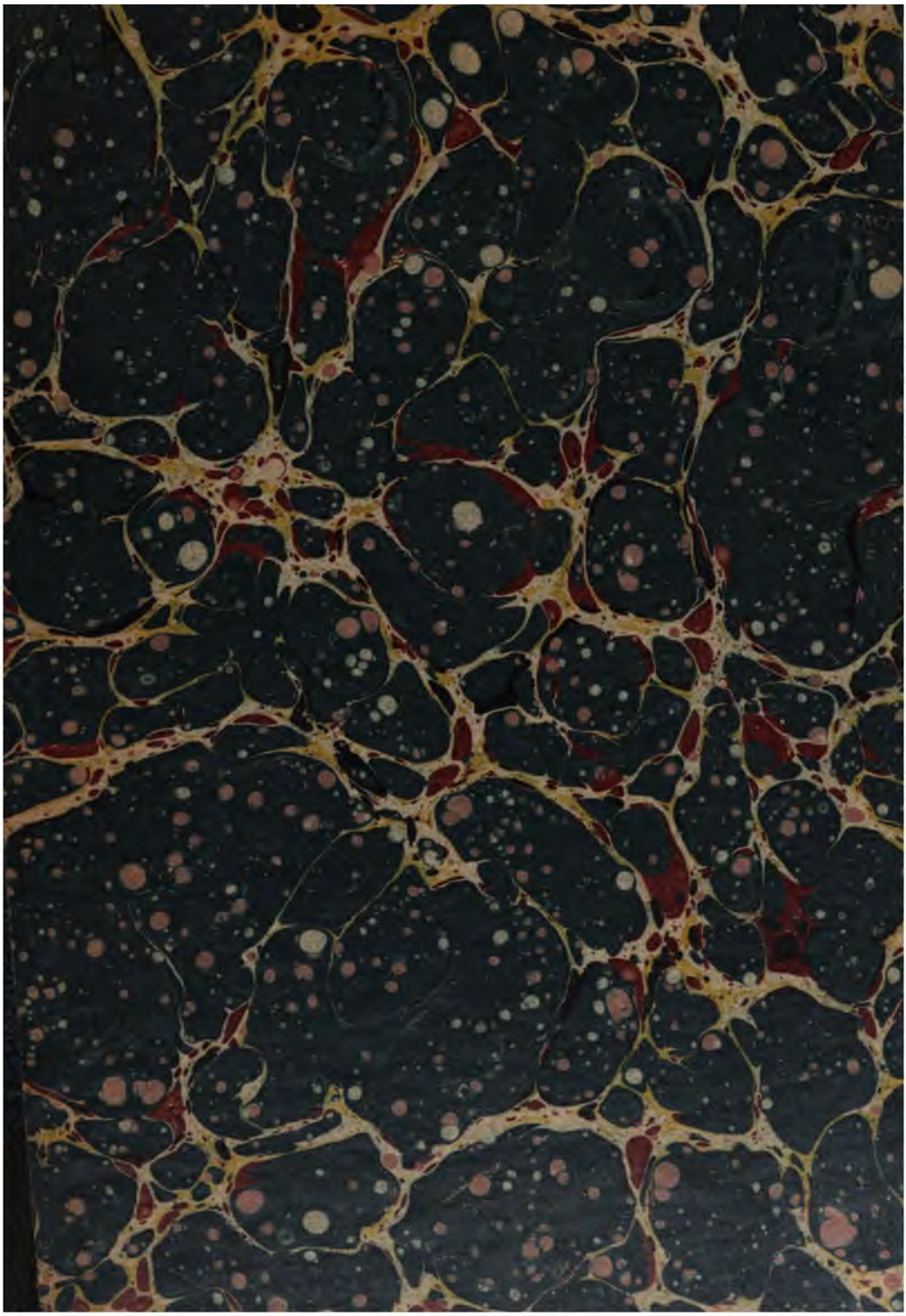

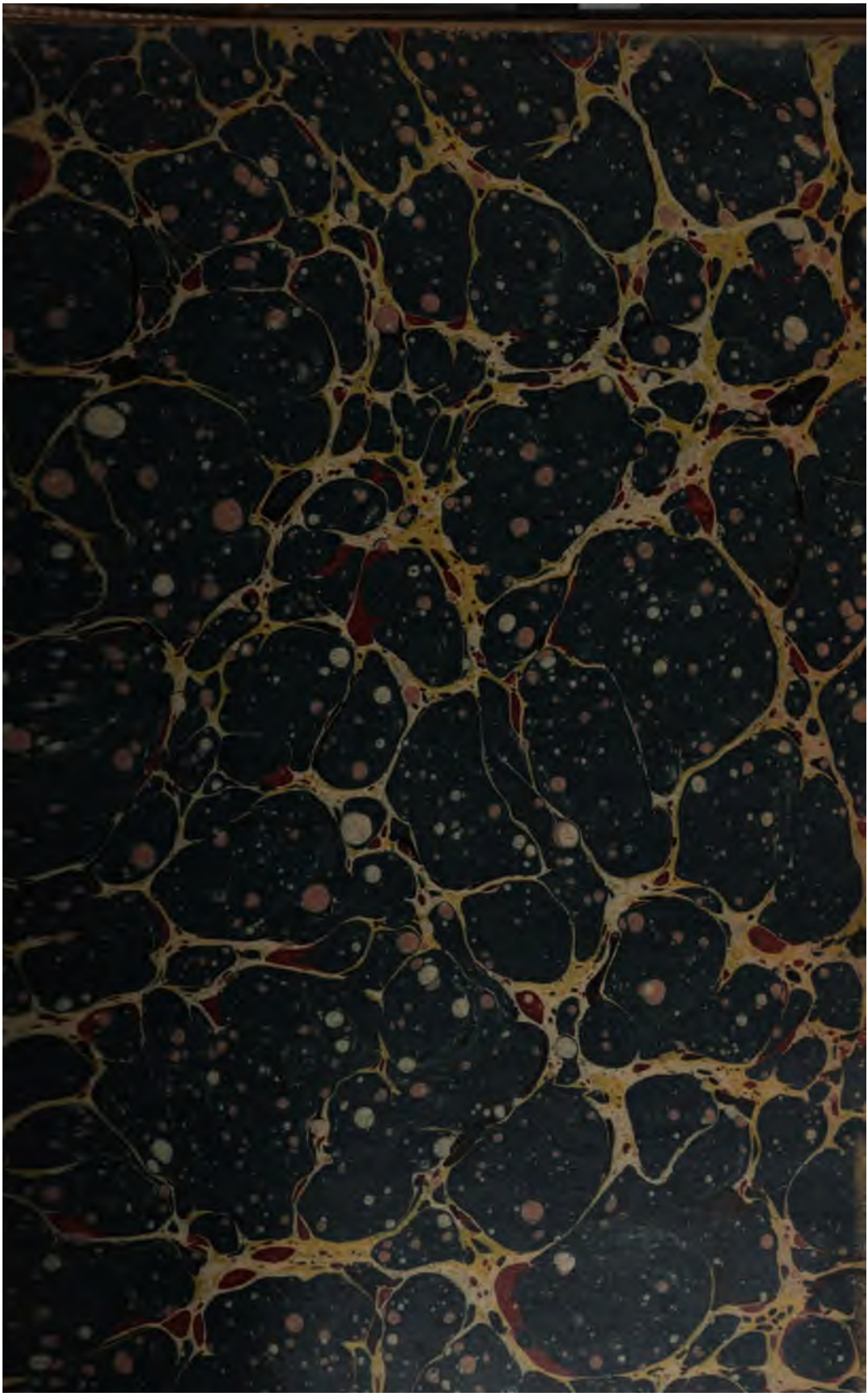

THE MONIST

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QUARTERLY MAGAZINE

VOL. IV

CHICAGO
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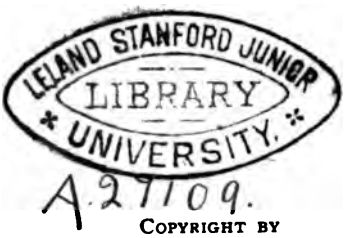

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APPENDIX.

The Dawn of a New Religious Era. Reprinted from *The Forum* of November 1893. Editor. (In No. 3 of this volume.)

VOL. IV. OCTOBER, 1893. NO. 1.

THE MONIST.

THE PRESENT STATE OF MATHEMATICS.*

THE German Government has commissioned me to communicate to this Congress the assurances of its good will, and to participate in your transactions. In this official capacity, allow me to repeat here the invitation given already in the general session, to visit at some convenient time the German University exhibit in the Liberal Arts Building.

I have also the honor to lay before you a considerable number of mathematical papers, which give collectively a fairly complete account of contemporaneous mathematical activity in Germany. Reserving for the mathematical section a detailed summary of these papers, I mention here only certain points of more general interest.

When we contemplate the development of mathematics in this nineteenth century, we find something similar to what has taken place in other sciences. The famous investigators of the preceding period, Lagrange, Laplace, Gauss, were each great enough to embrace all branches of mathematics and its applications. In particular, astronomy and mathematics were in their time regarded as inseparable.

With the succeeding generation, however, the tendency to specialisation manifests itself. Not unworthy are the names of its early representatives: Abel, Jacobi, Galois and the great geometers from

* Remarks given at the opening of the Mathematical and Astronomical Congress, at Chicago, Ill.

Poncelet on, and not inconsiderable are their individual achievements. But the developing science departs at the same time more and more from its original scope and purpose and threatens to sacrifice its earlier unity and to split into diverse branches. In the same proportion the attention bestowed upon it by the general scientific public diminishes. It became almost the custom to regard modern mathematical speculation as something having no general interest or importance, and the proposal has often been made that, at least for purpose of instruction, all results be formulated from the same standpoints as in the earlier period. Such conditions were unquestionably to be regretted.

This is a picture of the past. I wish on the present occasion to state and to emphasise that in the last two decades a marked improvement from within has asserted itself in our science, with constantly increasing success.

The matter has been found simpler than was at first believed. It appears indeed that the different branches of mathematics have actually developed not in opposite, but in parallel directions, that it is possible to combine their results into certain general conceptions. Such a general conception is that of the *function*, in particular that of the analytical function of the complex variable. Another conception of perhaps the same range is that of the *Group*, which just now stands in the foreground of mathematical progress. Proceeding from this idea of groups, we learn more and more to coördinate different mathematical sciences. So, for example, geometry and the theory of numbers, which long seemed to represent antagonistic tendencies, no longer form an antithesis, but have come in many ways to appear as different aspects of one and the same theory.

This unifying tendency, originally purely theoretical, comes inevitably to extend to the applications of mathematics in other sciences, and on the other hand is sustained and reinforced in the development and extension of these latter. I assume that detailed examples of this interchange of influence may be not without various interest for the members of this general session, and on this account have selected for brief preliminary mention two of the papers which I have later to present to the mathematical Section.

The first of these papers (from Dr. Schönflies) presents a review of the progress of mathematical crystallography. Sohncke, about 1877, treated crystals as aggregates of congruent molecules of any shape whatever, regularly arranged in space. In 1884 Fedorow made further progress by admitting the hypothesis that the molecules might be in part inversely instead of directly congruent. In the light of our modern mathematical developments this problem is one of the theory of groups, and we have thus a convenient starting-point for the solution of the entire question. It is simply necessary to enumerate all discontinuous groups which are contained in the so-called chief group of space-transformations. Dr. Schönflies has thus treated the subject in a text-book (1891) while in the present paper he discusses the details of the historical development.

In the second place, I will mention a paper which has more immediate interest for astronomers, namely, a *resumé* by Dr. Burkhardt of "The Relations Between Astronomical Problems and the Theory of Linear Differential Equations." This deals with those new methods of computing perturbations, which were brought out first in your country by Newcomb and Hill; in Europe, by Gylden and others. Here the mathematician can be of use, since he is already familiar with linear differential equations and is trained in the deduction of strict proofs; but even the professional mathematician finds here much to be learned. Hill's researches involve indeed,—a fact not yet sufficiently recognised,—a distinct advance upon the current theory of linear differential equations. To be more precise, the interest centres in the representation of the integrals of a differential equation in the vicinity of an *essentially* singular point. Hill furnishes a practical solution of this problem by the aid of an instrument new to mathematical analysis,—the admissibility of which is, however, confirmed by subsequent writers,—the infinitely extended, but still convergent, determinant.

Speaking, as I do, under the influence of our Göttingen traditions, and dominated somewhat, perhaps, by the great name of *Gauss*, I may be pardoned if I characterise the tendency that has been outlined in these remarks as a *return to the general Gaussian programme*. A distinction between the present and the earlier period

lies evidently in this: that what was formerly begun by a single master-mind, we now must seek to accomplish by united efforts and coöperation. A movement in this direction was started in France some time since by the powerful influence of Poincaré. For similar purposes we three years ago founded in Germany a mathematical society, and I greet the young society in New York and its Bulletin as being in harmony with our aspirations. But our mathematicians must go further still. They must form international unions, and I trust that this present World's Congress at Chicago will be a step in that direction.

FELIX KLEIN.

CORRELATION OF MENTAL AND PHYSICAL POWERS.

THE popular judgment as to the compatibility, or otherwise, of mental and physical superiority, tends, broadly speaking, towards one or other of two diametrically opposed conclusions. The old-fashioned view was that excellence in one of these directions almost certainly implied deficiency in the other. The successful hard-reading student was, it was taken for granted, a poor thing in respect of his body. His running was good for little, his jumping was worth nothing. He had chosen a career, which, whatever it might promise in the way of future or posthumous fame, was sure to give him, for his portion in this life, weak eye-sight, a narrow chest, and feeble muscles. Against this view, another and quite opposite one found considerable acceptance in many quarters. The "muscular Christian," as he came to be called, after Kingsley had represented him to us, combined a very superior mind in a very sound body. There was nothing new in such a view, and those who like broad generalisations may declare that it was the reassertion of the Greek way of looking at man, in opposition to the clerical or mediæval way. Anyhow, it was assumed that the large-limbed hero was sure to be found high up in university class lists; and that if any youth left college, after three years' residence, running and jumping no better than when he came, it was only too likely that his tutor would be found to be as dissatisfied with his career as his trainer could have been, had he been provided with one.

So long as we confine ourselves to advancing individual instances, or to proving our generalisations by portraying characters

in works of fiction, both of these views have plenty to say for themselves, and against each other. Quite recently, however, some statistics have been collected upon the subject, which, whatever their deficiencies, have at least the merit of attacking the problem in the only way in which anything resembling a solution can be hoped for. Some years ago Mr. F. Galton, to whose ingenuity and industry so many branches of statistics are much indebted, started an Anthropometric Laboratory at South Kensington, London, during one of the large exhibitions held there. In the course of the year many thousand sets of measurements were obtained; but they had the drawback, which every statistician will recognise, that they were drawn from rather heterogeneous data. Men and women were alike dealt with, and these differed widely in age, social position, and previous bodily development; whilst the application of any mental test was quite out of the question. Another laboratory, therefore, of the same kind was started at Cambridge, where, as we shall soon see, most of these drawbacks were either absent or much reduced in importance.

As regards the physical tests, little need be said here, as they are mostly of a familiar kind. They dealt with the seven following particulars: (1) Eye-sight, i. e., the distance at which small "diamond type" print could be read with each eye separately. (2) Strength of pull, as in the action of drawing a bow; this was measured in pounds. (3) Strength of squeeze, with each hand separately. The instrument here had two handles at a few inches' distance apart, which were squeezed together against the action of a spring. The pressure exerted was measured in pounds. (4) The height (without shoes) measured in feet and inches. (5) The breathing capacity, measured by a spirometer. The number of cubic inches which could be exhaled, after taking a deep breath, was thus recorded. (6) The weight, in pounds, taken in ordinary in-door costume. (7) To this was added the measurement of the head in three directions at right angles to each other. The product of these three elements gave, on the average, a number proportional to the volume of the head. For brevity, this product has been here termed the "head volume."

As regards these physical tests, little explanation is needed, as they are familiar to most students of statistics, and some of them have been applied on a vastly more extensive scale than anything now to be described. The only points that need present notice is the *homogeneous* character of our data. The students at the English universities are mainly drawn,—as they have been since the time of the Reformation at any rate,—from what are commonly called the upper classes. That is, nine out of ten of them are the sons of country gentry, professional men, and well-to-do tradesmen. Physically speaking, they have generally been made the most of; since they, and their fathers before them, have been duly fed and clothed and exercised. There is, consequently, none of the irregularity of result which may be observed sometimes in statistics dealing with army recruits, when immature youths are suddenly put, for the first time in their lives, into a position really favorable to physical growth. As regards the homogeneous character of the human materials here dealt with, every statistician will realise its importance. A comparatively small number of accurate observations, applied to a well-defined class, will often outweigh in value a vastly greater number which have been drawn from a medley of various classes.

So much for the merely physical tests. Such novelty, however, as there is in our present results lies mainly in the attempt to bring some kind of mental test into correlation with the physical. I need hardly insist upon the difficulty of such a task. Many people think they understand as clearly what they mean by an "able" man, as by a strong or a tall man. Perhaps they do; but they soon find that every one else understands it just as clearly as they do themselves, and with a totally different result. The first-class orator, preacher, or poet in one judgment is plucked without question in another. In an elaborate indictment of the *Cambridge Mathematical Tripos*, made some years ago, the critic asserted, amongst other objections, "that the best man invariably came out second." This was not quite true; but if it had been, did it cross the writer's mind what sort of an upheaval of the foundations of society would result

from a determined attempt to hoist the best man in each department of life as near the top as that?

In a much examined university,—and perhaps nowhere else,—it does become possible to arrange and classify men with regard to their mental powers. There is, of course, no question here of taking an arithmetic mean, and it was not even attempted to arrange the men in order of merit. All that was done was to group them into three classes, respectively denoted here as *A*, *B*, and *C*. In *A* are included all those who attain a first class in any honor examination, or who secure a college scholarship. *B* comprises all the rest of the men who pass in honors, that is, the second and third-class men in their various examinations. *C* comprises all who merely pass for their degree, or try to do so and fail. What with the multitude and varied scope of modern examinations, and the intimate knowledge of the capacities and attainments of their pupils possessed by most of the tutors, there was no great difficulty found in grouping the students in this way. I am well aware of the objections which may be raised. It is not for a moment claimed that such a classification is perfect, even within the modest limits at which it aims. Able men may fail in the class lists through indolence or ill-health, as inferior ones may succeed through luck or drudgery. But it must be remembered that we only profess to deal with averages, not with individuals, and on averages such influences have little power of disturbance. There are probably few cricket or foot-ball clubs in which one or more men in the second eleven or fifteen may not be really better than some in the first; but what chance would the second team have of beating the first? If we were selecting an individual as a tutor or secretary, it would be folly to prefer an *A* to a *B*, without further inquiry; but to weigh groups against each other is a very different matter. All that is here maintained is that our *A*, *B*, *C* classes, *as classes*, stand out indisputably distanced from each other in respect of their intellectual capacity. Not only is the average superiority of one group over the next patent to all who know the men, but we may safely say of them, what could perhaps be said nowhere else, that if the men had to vote themselves into three such

classes, the results would not be very different from what were obtained by the tests actually employed.

Before proceeding to our main subject of comparison, there is one remark which I should like to make in reference to the physical tests. These were made in six specified particulars, the choice of these particulars being partly decided by the facility of prompt and accurate determination. It may fairly be inquired whether these are isolated characteristics, in the sense that preëminence in one of them carries no superiority in the others. If this were so, their significance would be much diminished, for the testimony of one of them would not corroborate that of the others. The tall men might tend to be stringy, the heavy ones to be puffy, and the man with great capacity for expiration might, so to say, have sacrificed the muscles of his sword-arm in order to devote himself to the peculiar duties of a trumpeter. The exact extent to which decisive superiority in one physical characteristic is thus associated with comparative superiority, or otherwise, in respect of other characteristics, has not, as far as I know, been previously investigated, and it is therefore worth while to give some statistics on the subject. The general conclusion we find to be that the man who is very good in any one direction physically, is distinctly above the average in all the other directions. The most striking proof of this fact is arrived at as follows: Conceive a selection made of "the best in ten." If there are a thousand, select the hundred best; if, as in the Cambridge statistics, there are about three thousand, select the three hundred best. This is, of course, to make a high demand. It was found, for instance, that this bodily "first-class man" was, in respect of height, six feet or upwards; in respect of breathing he could expire three hundred and five cubic inches; his minimum pulling strength was one hundred pounds; his "squeeze," with his strongest hand, was also about one hundred pounds. The test for his eye-sight required that, with each eye separately, he could read the small print employed at a distance of at least thirty-four inches. The following table gives a summary view of the results of comparing the various classes; each of these being selected, of course, for eminence in one quality only.

FIRST CLASS.	EYES.	PULL.	SQUEEZE.	BREATHING.	HEIGHT.	WEIGHT.
Eyes.....	34.7	87.5	84.3	265.3	69.41	157.1
Pull.....	25.6	112.3	94.1	282.9	69.98	167.7
Squeeze.....	24.5	95.7	102.3	279.8	70.41	169.2
Breathing.....	24.8	93.8	91.4	321.0	71.34	168.1
Height.....	24.6	88.3	89.2	291.0	73.31	170.8
Average student..	23.6	83.0	83.4	255.4	68.91	153.3

The meaning of this will be readily understood. Thus the men comprising our first class in respect of their pulling power (the minimum requirement being one hundred pounds) can, on an average, read at a distance of 25.6 inches; can, on an average, pull 112.3 pounds, and so on. The result is, I think, rather remarkable, for it is seen that great superiority in any one direction implies decided superiority in every other direction. That some of these capacities should be thus correlated is only what we should expect; it would be thought strange, for instance, if pulling and squeezing power did not go together, or height and weight. But one could not with equal confidence have anticipated that the taller men should have distinctly better eye-sight; or that the men selected solely for their superior eye-sight should have decidedly better muscles for pulling purposes, and stand half an inch taller than the average. The reader must not underrate the significance of the apparently small differences with which we are concerned. We are dealing with the averages of large numbers; large enough to make a difference of half an inch of stature utterly unaccountable as a mere coincidence.

This extent of correlation of physical powers seems to me to add considerably to the value of our tests. It meets the objection that we have no right to assume that the tall man, or the man with muscular arms, is in the widest sense of the term a physically robust or strong man. If we find that four or five perfectly independent tests all point in the same general direction, we have some ground for supposing that the qualities thus tested are *not* independent, but that they are integral components in the building up of the generally healthy and powerful man.

As regards the comparison of the intellectual and the physical arrangements of our men, the simplest plan is to give at once a summary table of the results.

	NUMBER TESTED.	EYES.	PULL.	SQUEEZE.	HEAD.	BREATHING.	HEIGHT.	WEIGHT.
A	674	22.9	$1 8	$3 4	243.82	256.5	68 81	153 0
B	1370	23.7	$2 8	$3.2	238.34	255.7	68.98	152 5
C	1138	23 9	$4.1	$3.6	236.44	254.5	68 88	154.2

Such a table as this may be examined with two different degrees of minuteness in respect of the appreciation of differences: which would commonly be called the practical and the theoretical way of regarding them. By the former, speaking in the more accurate language of statistics, we may understand a degree of precision which does not recognise distinctions of less than about four or five per cent. of the totals involved. Looked at with this degree of nicety, the main fact that the tables yield is that there is really no difference between the physical characteristics of the different intellectual grades. Whether in respect of height, weight, power of squeeze, eye-sight, breathing capacity, or head-dimensions, one class is just about as good as another. The trifling existent differences tell sometimes one way and sometimes the other, and appear, to the eye of the plain man, well within the scope of accident. There are, indeed, three points about which some doubt might be felt, viz., the size of the head, the pulling power, and the eye-sight. The first of these is of sufficient importance to be reserved for special examination, and will be subjected presently to a severer test. The two latter are just the sort of differences as to the significance of which the untrained mind is troubled with a doubt. The high-honor men show a trifling inferiority of eye-sight, it is true; but the diminution does not, so to say, step on uniformly through the three classes, *A*, *B*, *C*. On the other hand, the falling off in strength of pull, though no larger in amount, does seem to keep step somewhat better.

The matter is worth looking at a little closer from a slightly different point of view. Revert to the physical distribution of the men, described already, in accordance with which they were grouped into ten classes: and select the top class, which comprises "the best in ten." They are, in each separate department, about three hundred in number. We may then inquire, in respect of these exceptionally

vigorous men, How are they distributed as regards *A*, *B*, *C*? We know in what proportions they ought to be distributed, by mere chance, or if their bodies and their minds had, so to say, nothing to do with each other: are the proportions actually found to prevail, very different from this? The answer is that, as regards eye-sight, any doubt which we felt at first may now be considered as much weakened, if not set aside. The most perfect powers of vision which our test can furnish are very nearly as likely to be found amongst the hard-reading and high-honor men as amongst the idlest. The total number of this first class in respect of sight was 302. The distribution of them into *A*, *B*, and *C* that would have been expected if the qualities were quite independent is 64, 130, and 108: the actual distribution is 61, 140, and 100, a very trifling difference. It is quite clear that, taken as a whole, our studious men do not overstrain their eyes. As regards the pulling power, the decision yielded by this method tells the other way; and suggests that, for one reason or another, hard reading and hard pulling are slightly, though only very slightly, incompatible. The figures are these. Our first class here contains 289 men. If these had been drawn at random out of the *A*, *B*, *C* classes, we should have expected these three classes to furnish respectively 61, 124, and 104. As a matter of fact they furnish, 41, 119, and 129. Such a difference as this, then, indicated by one kind of evidence and confirmed by a slightly different kind, cannot be regarded as accidental. Why is it that the hard-reading men, who are just as well developed in general respects,—who stand as high, weigh as heavy, and have equally clear eyes and sound lungs, and can even squeeze as hard with the muscles of the hands,—why is it that they show a small but distinctly marked deficiency in the particular action of pulling at a bow? The only reason which seems at all plausible is that though these men take abundantly sufficient out-door exercise to develop their *general* capacities, they, or a considerable minority of them, do not so largely practice certain athletic exercises which strengthen the muscles in question. In other words, they are presumably less addicted on the whole to rowing, cricket, and tennis. One would not have thought it was so, speaking from a general knowledge of their habits; but

it certainly seems as if this was the only probable explanation of the undoubted facts of experience.

The foregoing conclusions are, I think, the most important which could safely be drawn by the practical man who judges the statistics as they stand; that is, without resort to any of the tests which theory can offer for our help. When we resort to this aid we are able to give a satisfactory answer to the question whether the reading men, as a rule, have bigger heads. On the face of the matter it is clear that they do, so far as these statistics extend. Moreover there is a successive advance of size from *C* to *B*, and from *B* to *A*; and also, what does not appear from the only tables we can find space for here, the same progressive advance is exhibited in each of the three separate batches of about one thousand each, of which the total before us is made up. Still the resultant difference is numerically small: it only amounts to somewhat less than three per cent. of the totals. Can any reliance be placed upon such a small difference?

The answer is that the difference *is* significant, past all bounds of reasonable coincidence or accident. The way in which the statistician treats the question is well recognised. He first inquires what is the amount of fluctuation or variation amongst the detailed measurements; this gives him a measure of the degree of uncertainty attaching to the individual observation. He then asks what is the total number thrown together into one class in order to furnish an average. A great deal turns upon the magnitude of the numbers with which we are thus dealing. If, for instance, we had based our conclusion upon the averages drawn from classes consisting of only *ten* each, nothing worth a moment's notice would have been obtained. If based upon a hundred, the conclusion would still have been worth but very little. But in the case before us we have, roughly speaking, about a thousand separate instances in each of the three classes under comparison. It admits of proof that a difference amounting to three per cent. has chances measured by thousands to one against its having been of accidental origin. We need feel no manner of doubt that if we were to take a fresh batch of three thousand measurements of the same kind, and subject them to the

same sort of examination we should have a recurrence of the same results. This is, in fact, what we mean by a non-accidental phenomenon.*

The set of statistics from which the above conclusion was drawn were also employed to decide another, and very different question. It has, unless I am mistaken, been held that the growth of the head ceases at about 19. Our statistics, when the *A*, *B*, *C* classes are all thrown into one, and these are arranged in order of age instead of any kind of intellectual order, furnish a fairly satisfactory answer to this inquiry. What, of course, in full strictness we ought to do, is to get hold of the same men and measure them each year from 18 to 24, say, and then, by comparison of a number of such sets of observations, decide if there is any growth in the dimensions. This we could not do, for the men who appeared were all volunteers who could not be summoned for re-measurement, and indeed very few of them could have been found who would be resident for a sufficiently long period. But one of the many conveniences of the statistical handling of large numbers is that, for certain purposes, the examination of different men at the same time will be practically equivalent to the examination of the same men at different times. So here. Take 400 or 500 different men at each successive age from 18 to 24, and the results for statistical purposes will be just the same as if we took the same batch of men and measured them year after year. We feel confident in doing this, because we know that the

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* The figures given in the table were obtained as follows: Three measurements of the head of each man were taken: the width, from side to side; the depth, from front to back; and the height, above a plane passing through the ears and eye-balls. These three multiplied together, yield what we may call a "head-volume," viz., a number proportional, on an average, to the size of the head. What in strictness we ought to have taken for subsequent examination would then be the *mean of these products*. But, as this would have taken very great labor, I have taken instead the *product of the means* of each of the three separate measurements. The difference thus involved is very small, and for the purposes of our inquiry is quite unimportant. The average of these products is about 240; the "probable error" of the individual products is about 17. The usual formula for the "probable error" between the means of two batches, each containing 1000, would be $17 \times 1 \cdot 1 \div 500$, viz. less than 1. The actual difference amounts to 7, which is enormously improbable as a chance result.

men who come up year after year all belong to the same homogeneous class.

AGE....	18	19	20	21	22	23	24	25
HEAD...	236.4	236.7	237.6	238.3	239.8	240.6	243.5	243.5

These represent a total of 3192 men. The last compartment comprises those of all ages from 25 upwards, though those who are beyond this last age are extremely few in number. The figures indicate a slow but unmistakable growth in the size of the head during the whole of the college career. It may be remarked that there is no growth of stature perceptible during this period.

There is one very important conclusion which may be drawn from the results of these anthropometrical observations. It concerns what—if this is not too pedantical an expression to use—may be called the theory of examination. In England, and elsewhere, a large number of posts in the Civil Service and other branches of the state employment are awarded by the results of examination. There is, of course, in most or all of these some preliminary physical test demanded; but this is merely a requirement which every candidate must pass; it forms no part of the real examination itself. No marks are awarded for distinction in this respect, and no further attention is paid to it in case the candidate succeeds in satisfying the medical man that the minimum requirement has been attained.

It has been suggested, however, that something far beyond this might conveniently be introduced. As the grounds on which such a suggestion is based are not generally understood, a few words of explanation may be advisable. In most of the examinations of any magnitude with which the state is concerned, it may be taken as a fact of experience that the number of candidates bears some moderate ratio to the number of those who compete. If, for instance, there are 30 posts to be given away, we should expect perhaps 60 or 100 to apply for them: it would be a rare thing to find these numbers as low on the one hand as, say, 35, or as high on the other as 300 or 400. From this an important consequence follows. It is well known that whenever a considerable number of objects are arranged in order of magnitude or intensity in respect of any quality, the differences between them are very much greater towards the two

ends than towards the middle. This is only a case of the so-called Law of Large Numbers. If it was a case of measurement of stature, for instance, of one thousand men, we shall probably find that at the top and bottom of our list,—amongst the giants and the dwarfs,—two successive men might differ by as much as several entire inches; whilst towards the middle we might range over one hundred without finding a total difference of a single inch. The same fact is notoriously true in examinations, wherever marks can be assigned with any accuracy. In mathematics, for example, the first few men will differ widely from each other in merit; and, if the same does not hold good of the men who come last, this is partly because the really bottom men know better than to go in for such an examination. They have been otherwise provided for.

It follows from these two facts,—the law of grouping about the mean, and the empirical observation as to the proportional numbers of candidates,—that the men who are only just excluded are practically quite as worthy as those who are only just admitted. Accident rather than merit has determined their fate, the differences amongst them being too small for accurate determination. Suppose, to put a fictitious case, that three hundred men had applied for one hundred posts in the army or in the civil service. The examiners do their work, and give us a list of the one hundred who come out first. But if they have any experience they are well aware that if they were to go through the same process a second time, or the task were assigned to another set of equally competent examiners, the result would be different. All the men who were high up in the list would invariably be again secured, but it is not at all unlikely that some ten or fifteen of those at the bottom would find that their places had been taken by others.

We know, then, that in respect of the subject-matter of that examination it really matters very little which particular set of men we select, provided that we are speaking of those who are some considerable way down the list. We adhere to the examiners' order, not because we have any firm faith in its accuracy, but because there would otherwise be suspicion of unfairness. But it becomes a pertinent inquiry whether some other test, of a physical kind, might

not be introduced in order to distinguish between them. In the above example; if we take the ten who just get in and the twenty who just fail, we know that they are all, so far as the intellectual character under examination is concerned, practically on a par. But, so far as their physical character is concerned they are by no means on a par, but will differ as widely as any random selection of thirty might be expected to do. We might therefore gain much as regards the body, and lose very little as regards the mind, by subjecting these thirty to a purely physical test, and selecting the ten best, on this ground alone. So long as it was doubtful whether bodily and mental excellence were not to some extent antagonistic, there might have been considerable risk in adopting such a course. But now that we know that there is decided evidence in support of the view that these qualities are independent of each other, it is otherwise. Amongst the thirty men between whom no ordinary examiner could rationally and confidently discriminate, the physical examiner will probably find a very wide difference.

If it ever were found desirable thus to introduce physical tests into our examination procedure, the physiologist and medical man would have to be consulted as to the particular form of test to be selected. So far as our special results are concerned, I should have been inclined to think that the best single test is that of the breathing power. The general law that excellence in one department is correlated with decided superiority in all others seems to be more than usually applicable here. Experience shows that our physical first class, when selected on this ground, yields a slightly higher level all round than when selected on any other ground, though the difference is not great. I was also inclined to think, at first, that there might be a further advantage in the fact that this characteristic was, so to say, somewhat more deeply seated in our frame; that it might not, therefore, be so readily "crammed" for the special purpose of examination. But an expert in such matters informs me that this is not so, and that an ingenious "coach" can, with a little training, soon produce a large relative increase in the measured capacity of inspiration and expiration. The fact is, unfortunately, that whenever we resort to examination of any kind we shall sooner

or later find that we have to reckon with the crammer. His ways are past finding out, at any rate by devices to which the examiner can fairly resort. Many a little scheme, which in itself would have been excellent as a test, has been ruined in this way. Could the men have been brought forward in uniform ignorance of what they were going to be subjected to, we might have secured an excellent means of discrimination amongst them. But the crammer's foresight has anticipated us; and we soon find that what we are really testing is, not the natural capacity of the men, nor even their acquired capacity, but rather the ingenuity of their temporary teacher and the length of time they have been under his charge.

Whilst on this subject, there is one illustration of too important a nature to be omitted. It has been already pointed out that, so long as we deal with any large homogeneous class, we may safely assume the independence of the physical and mental qualities. We feel sure that by raising our demands in the latter respect we shall not be obliged to lower them in the former. But when the class is not homogeneous this postulate is no longer sound, and we may fall into very serious error. Broadly speaking, the Cambridge students, as already remarked, are a very homogeneous body. But there is found amongst them, at the present day, a sub-class of a very different origin. The Indian students, though not a numerous body, have furnished a sufficient number of data for us to be able to draw some conclusions as to their general average characteristics. These men, it need hardly be said, do not come from the fighting races of the Northwest of the British Indian Empire, but almost exclusively consist of highly educated Bengalees. Intellectually they show no deficiency. They are, in fact, the sort of men who rise to the top in any examinations in which they are pitted against other natives. Some of them have already, by their success in the Indian Civil Service Examination, earned posts in which they assist in governing the British Empire. So long as their numbers are relatively small, probably nothing but good comes of this; but we may fairly ask what would come to pass if, in course of time, whether owing to their real capacity, their disposition to the career,

or their relative population, the number of selected candidates of these nationalities were to become preponderant.

Those who regard consistent adherence to the course in which we have once started as a prime duty, will doubtless say that this is all as it should be; for that the men who rise to the top of the list have thereby proved their fitness for the work to which that examination was the portal. I am not going to argue this question, but will just offer one small contribution to its solution. These clever Asiatics, who, as we find, can often hold their own against their European competitors in the examination-room, how do they compare with them physically? Reverting to our scheme of arranging the men into ten successive physical classes, what we find is briefly this: The Indian students, on an average, stand in respect of their "pull" in the eighth class; in their "squeeze" and height, in the ninth; in their breathing power, in the tenth. They are nearly half a stone less in weight, and their eye-sight is similarly below the average. Those who admit that physical vigor has something to do with the foundation and retention of empires will allow that such facts as these may some day stand in need of careful revision and discussion.

J. VENN.

DR. WEISMANN ON HEREDITY AND PROGRESS.

I PROPOSE to consider Professor Weismann's views on heredity and progress as set forth in his recently published volume on the "Germ-Plasm" and elsewhere. But I must consider them here rather in their broad and philosophical aspect than in minute biological detail. Those who are endeavoring to frame a monistic interpretation of nature cannot afford to pass by the matured conclusions of a thinker distinguished alike by his mastery of facts and his power of bold, keen, and fearless speculation. But what they want is the net result of his observation and thought, that they may appreciate its bearing on philosophy in general and monism in particular. And if I find cause to criticise some of Dr. Weismann's conclusions I shall here base my criticism not on specifically biological or histological grounds, but on general or *a priori* considerations; for though it is folly to reject a carefully observed fact on *a priori* grounds, it is in accordance with sound method to submit a theory or hypothesis to *a priori* criticism, which is indeed the testing of the congruity of the hypothesis in question to the whole body of philosophical knowledge which constitutes the interpretation of nature which the critic has been led to accept.

Taking the question of heredity first, let us select three well-known facts of organic life and see how Dr. Weismann explains them—always remembering that he puts forward his explanation nowise dogmatically but with due modesty and reserve. The three facts I speak of are, first, the development of the higher animal or plant from a fertilised egg-cell; secondly, the development of certain animals or plants from buds; and thirdly, the regeneration of

lost parts. This regeneration, to take that first, is seen both in the unicellular and in the multicellular organisms. If the oral or mouth-end of one of the infusorians be excised, this portion will be reproduced and the perfect infusorian reconstituted. It would seem to be essential that the part in which the missing parts are thus regenerated should contain a fragment at least of the nucleus of the cell which constitutes the protozoan animalcule. So that we may say that in this case a mutilated fragment of an infusorian cell possesses the potentiality of reconstituting by assimilation and growth the perfect unicellular organism. If a fresh-water hydra be cut in two and the two parts carefully watched, that which contains the base of attachment will be seen to regenerate a new mouth and tentacles, while that which contains the mouth and tentacles acquires a new base of attachment. Or, if the hinder "horn" of a snail—that at the end of which is the eye—be snipped off, a new horn, with a new eye perfect in all its parts, will be regenerated in a few weeks, the exact time varying with the temperature and the age of the snail. And this will occur not once only, but many times in succession. The group of cells which remain to a mutilated hydra or snail possess the potentiality of reproducing by assimilation and growth the perfect multicellular organism.

The same animal, the fresh-water hydra, will afford us a sufficient example of reproduction by budding. Under favorable conditions of temperature, with abundant nutrition, a little protuberance makes its appearance in the tubular body of the polype. This grows rapidly, and gradually assumes the form of a smaller hydra attached to the parental organism. After a while it becomes detached as an independent individual. The body-wall of the hydra consists in the main of two layers, an outer layer composed of large conical cells with small interstitial cells between the points of the cones, and an inner layer of nutritive cells, the two layers being separated by a thin supporting lamella. And it would seem that the bud takes its origin from the interstitial cells of the outer layer. Dr. Weismann indeed assumes that it takes its origin from a single cell of the inter stitial series; and it is somewhat characteristic of his method that the assumption once made rapidly takes the form of a statement of

fact. "Each bud," we read, "must originally arise from *one* cell only, although the fact has not yet been actually proved"; and then, half a dozen lines further down, we have: "In the *Hydromedusæ*, then, each bud originates in a single cell." The admittedly unproved assumption already poses as a fact. The assumption itself, however, is not an improbable one; and if we grant its validity we may say that in the hydra a single interstitial cell has the potentiality of producing under appropriate conditions an organism similar to the parent.

Passing to the sexual method of reproduction we find the essence of the process to lie in this, that a single egg-cell produced by an organism unites and coalesces with a single sperm cell produced generally but not invariably by another organism of the same species, and that the fertilised ovum thus produced has the potentiality of producing under appropriate conditions an organism resembling the parents. In certain rare cases, where parthenogenesis obtains, fertilisation does not occur, but the ovum alone possesses the potentiality of reproducing an organism like the parent.

Now the problem is, in all these cases, to give something like a scientific explanation of what I have termed potentiality—the potentiality in the divided protozoan cell of reconstituting the perfect unicellular organism; the potentiality in the mutilated snail of regenerating a lost tentacle; the potentiality in certain interstitial cells of the hydra of giving rise, by cell-multiplication and differentiation, to young hydras; the potentiality in the fertilised egg of reproducing an organism like the parent. What is this potentiality? What is there actually present in the cell or cells concerned which may afford an embryonic basis for the changes which under appropriate conditions, follow in orderly sequence?

In presenting the answer which Professor Weismann gives, let us take first the case of the unicellular organism. This consists of a central nucleus, and of a cell-body. The latter exhibits observable differentiations of structure; but it is by the former, the nucleus, that these differentiations are controlled. The nucleus, therefore, contains, according to Professor Weismann, a store of specialised particles which are the bearers of the peculiar morphological qual-

ities of the cell-body. These particles he terms *biophors*. The biophors are to molecules what molecules are to atoms. Just as the molecule is due to the combination and grouping of atoms to form a higher *physical* unit, so is the biophor due to the combination and grouping of molecules to form a higher *biological* unit. They are the smallest units which exhibit the primary vital forces, assimilation and metabolism, growth, and multiplication by fission. With such biophors, then, the nucleus of the protozoa is stored. "In the unicellular forms heredity will therefore depend, firstly, on the fact that all the different kinds of biophors which are required for the construction of the body are present in the nucleus in a latent condition and in definite proportions—very probably they have also a definite style of architecture; and secondly, on the periodical or occasional migration of these biophors into the cell-body, where they multiply and become arranged in obedience to the forces acting within them. The difficulty of ascertaining the actual mode of arrangement is nowhere greater than in the case of the higher unicellular forms. How it is possible that the nucleus should allow only those kinds of biophors to migrate which are required to replace those structures lost by division? And why do these biophors always move either in the direction of the missing oral region, or towards the posterior end of the body, according to which parts are wanting in the two daughter-animals? For the present these questions are unanswerable; and in the meantime we must be content with having shown how the materials for the construction of the cell-substance are transmitted from mother to daughter, and in what way they are placed at the disposal of the forces acting in the cell-body."

We may say, then, that in the reconstruction of a divided protozoön the potentiality is due to the assumed presence in the nucleus of hypothetical biophors. Of the nature of the forces which act upon the biophors and render reconstruction possible we know little or nothing. It is clear that we have not got much beyond our potentiality. Nevertheless, the conception of biophors is likely to be helpful.

In the multicellular organisms we have an assemblage of independently and hereditarily variable parts; but the number of these

independently variable parts, though great, falls very far short of the vast number of individual cells of which the organism is composed, for, in the first place, there are the multitudes of practically identical cells, such, for example, as the blood-corpuscles, and, in the second place, many of these parts consist of groups of cells, such, for example, as the spots on some butterflies' wings. Dr. Weismann assumes that for each independently variable type of cells, or groups of cells, there exists in the fertilised ovum a *determinant*, that is, a vital unit of a higher order than the biophor, consisting of a group of biophors, and possessed of special qualities. As cell-division proceeds, these determinants are distributed, and when they reach their final destination in the course of development, they break up or disintegrate into their constituent biophors and thus determine the structure of the ultimate cells. These determinants are capable of multiplication by fission; and hence a relatively limited number of these units suffice for the determination of the relatively limitless number of cells in the completed organism.

Here again, without undervaluing the suggestiveness of the hypothesis, we have to notice that what is really the essential problem—the distribution of the determinants during cell-division—remains untouched. In place of the vague potentiality of the fertilised ovum we have certain hypothetical structural units, the determinants. How the potentiality is distributed, and how the determinants are distributed, are alike unknown. It is clear that we have not got much beyond our potentiality. Nevertheless, the conception of determinants, as an attempt to think along physical lines, is to be welcomed.

With regard to the budding of such an organism as the Hydra, Professor Weismann has not much to offer that is helpful towards the solution of the problem. What he does offer practically comes to this: Since an interstitial cell has the potentiality of giving rise to a new Hydra, such cell must have, in an inactive form, all the necessary determinants. *Voila tout!* So, too, with regard to the regeneration of lost parts. The cells which remain are assumed to possess supplementary determinants for the reconstruction of the

parts which are lost. There is but little advance here on the old-fashioned potentiality.

It must be remembered that we are regarding the matter from a standpoint which only permits a very broad and general view. There is in Dr. Weismann's work a great deal of accurate and suggestive biological detail, which gives to his whole treatment of a difficult subject a value which is well worthy of the generous welcome which it has received. And if in endeavoring to pierce to the hidden cause of hereditary transmission he has failed to do more than suggest that the transmitted potentiality is due to transmitted biophors and determinants, this does but show how far even our leading biologists still are from being able to give a detailed explanation of the mysteries of organic development. As was to be expected from a student of morphology, the suggested explanation is mainly structural, though references to the unknown forces at work are not omitted. And this, no doubt, in the present state of scientific knowledge, is the wiser course. There can be little doubt that structure is merely the visible expression of the subtle play of invisible forces; but we are wise to focus our attention first on the structure and then endeavor to pierce to its hidden cause. Still there is perhaps too great a tendency on Dr. Weismann's part to lay too much stress on the transmission of material particles, too little stress on the transference of subtle modes of energy. He assumes that each vital unit, from the lowest to the highest, can only arise by division from another like itself, and is, therefore, forced to attribute the regeneration of lost parts in the unicellular organism to migration of biophors from the nucleus, saying that such regeneration cannot be the result of the emitted influence of the nuclear substance. This is so, on the assumption adopted; and it may be so in nature. But it is possible that the reconstitution is due to the play of molecular forces and is analogous on the biological plane, to the reconstitution of a chipped crystal on the physical plane.

I must now pass to the second division of my subject, namely, a consideration of Professor Weismann's latest views on progress; and here it will be well to confine our attention to those higher animals which multiply by the sexual process, each individual taking

origin in a fertilised ovum. The ovum and the sperm by which it is fertilised alike contain germ-plasm; and this germ-plasm is stored with determinants of common derivation by multiplication with those, the distribution and disintegration of which gave rise in development to the parental organisms. We may put the matter diagrammatically thus: The compound nucleus of the fertilised ovum is divided into two parts of similar potentiality. Of these, one, through the distribution and disintegration of the contained determinants, gives rise to the developing organism. The other, increased in volume through nutrition and growth and subdivided into ova and sperms, is retained by that organism in the undistributed condition, to subserve the purposes of further reproduction. Now progress depends on variation; and the question here is:—how do effective variations arise? By effective variations I mean those in virtue of which the offspring is raised, in any particular respect, beyond the maximum in either parent or in any ancestor. We may distinguish two kinds or phases of progress. First, progress through the selection of existing maxima; secondly, progress beyond the existing maxima. The latter involves variations of the kind which I have here termed effective. It is obvious that in the evolution of the existing forms of life such variations must again and again have occurred. How do they originate? To what are they due?

Let us first note that no process of selection of maxima or elimination of minima can of itself give rise to effective variation. All it can do is to lead to breeding from maxima only. But, of course, if the maxima are raised through effective variation, *then* selection or elimination may conduce to interbreeding between these new maxima and thus lead to effective progress. Secondly, let us notice that no getting rid of determinants, through differential division, either in the process of the multiplication of the cells which contain the germ-plasm, or in the process known as the "extrusion of the polar cell," or in any analogous process in the division of sperms, can of itself contribute to effective variation. Such effective variation must depend, according to Professor Weismann's principles, on the production of new and more highly evolved determinants. Again we must note that no mingling of determinants from

different sources can lead to effective variation, or the genesis of more highly evolved determinants. At one time Dr. Weismann was inclined to attribute effective progress to that mingling of the nuclear matter of ovum and sperm in sexual reproduction to which he has applied the term *amphimixis*. Some three years ago the present writer drew attention to the fact that what he now terms effective progress could not be so accounted for. Other writers have insisted on the same fact. And now Dr. Weismann himself says that "the origin of a variation is equally independent of selection and of amphimixis."

To what then does Dr. Weismann attribute effective variation? "It is due," he says, "to the constant recurrence of slight inequalities of nutrition (the term 'nutrition' being used in its widest sense, so as to include differences in temperature, etc.) in the germ-plasm which effect every determinant in one way or another, and differ even in the same germ-plasm,—not only in different individuals but also in different regions." "We cannot possibly attribute," he further says, "the immense number of adaptations to rare, fortuitous variations, occurring only once. The necessary variations from which transformations arise by means of selection, must in all cases be exhibited over and over again by many individuals." They seem to be due to "the permanent action of uniform changes in nutrition." "We are therefore undoubtedly justified in attributing the cause of variation (in varieties of plants which have originated from seeds) to the influence of changed external surroundings."

How changes of nutrition produce particular variations in the determinants of the germ-plasm Dr. Weismann has not pretended to say.

Dr. Weismann remains as firmly convinced as ever that characters acquired by the individual are not, and on his interpretation cannot be, transmitted to that individual's offspring. All variations arise endogenously within the germ-plasm ; there is no transference to the germ-plasm of exogenous somatic variations impressed upon or evoked in the muscular, nervous, epithelial, or other tissues of the body. In this he is quite logical and consistent. And he is in my opinion right in maintaining that there is at present no conclu-

sive evidence in favor of such transmission of acquired characters. Facts or groups of facts with a general tendency in that direction there may be; but definite proof, in my judgment, at present there is not. If such proof should eventually be forthcoming, it will be difficult to resist the conclusion that the determinants of the germ-plasm, if such exist, are subject to the influence of the complex transformations of energy which take place in the somatic tissues. It is more readily conceivable that the determinants are modifiable by the functional activity of parts which originate by the distribution and disintegration of similar determinants, than that they are modifiable by material particles, biophors or other, transmitted to the germ-plasm from the varying somatic parts. All such speculations are, however, at present, premature.

We may now sum up in a few words the salient features of Dr. Weismann's views on development, heredity, and progress, in so far as they apply to the higher animals. (1) The development of the individual from a fertilised ovum is essentially germinal; that is to say the compound nucleus already contains in the form of determinants the germs of all the varied parts of the complex organism into which it will develop. (2) Heredity is provided for by the constant holding in reserve of some of the germinal matter which increases by growth and cell division, portions thereof being periodically detached in the form of ova and sperms. (3) Effective variation, on which progress through natural selection depends, is provided for by the influence of "nutrition" upon the determinants contained in this reserve germ-plasm.

The first of these propositions is a modern restatement of the old hypothesis of "evolution"—this word being here used in a sense different from that which is to-day in every one's mouth. "Evolution" here means unfolding; and is applied to the view that the potentiality of development of the fertilised ovum is due to the existence therein of miniature parts exactly resembling those of the adult. It is opposed to "epigenesis" concerning which Professor Weismann says: "I tried in several ways to arrive at a satisfactory epigenetic theory, which, starting from a germ-substance of comparatively simple structure, should exhibit the various differentiations of

the organism as due to regular changes brought about by the division of this primary structure. But the more I considered the problem as time went on, the more I was convinced that such a solution was impossible." This I take it is a distinct and total rejection of epigenesis. And in the light of this complete rejection of epigenesis we may infer what a determinant is. It is, in the first place, a particle of germ-plasm which corresponds to and determines the cells or groups of cells which are independently variable. Let us suppose that my finger-nail is an independently variable part, the product of a single determinant. Then if the nail was formed by "evolution" and nowise epigenetically, its determinant contained in miniature all the minute details of its structure, only *enfolded* and not yet *unfolded*. So that, in the second place, the determinant though it is not a miniature of the fully formed part, contains enfolded miniature germs of all the details of that part. Every detail is already present, but the details are not yet marshalled and ordered. And in general all the details of the adult (with the exception of those which are due to repetition and could thus arise by multiplication) are represented in the nucleus of the fertilised ovum.

It is questionable whether this structural thesis can be maintained either biologically or physically. But it is when we come to consider the energy rather than the matter, that the conception of "evolution" (unfolding) seems to me completely to break down. It is inconceivable that in the compound nucleus of the fertilised ovum there exist in miniature all the varied modes of energy that characterise the life of the adult organism. We are forced to believe that this complex energy arises epigenetically from the simpler energy of the ovum. And if there is this epigenetic development of energy, it is reasonable to infer that there is an epigenetic development of the structure which manifests this energy. I believe therefore that the first of the three propositions is unsound at the core and should be rejected.

The second proposition, if it be held to involve an absolute distinction between germ-plasm and body-plasm, is of doubtful validity. But if it be taken broadly as a statement of the view that cer-

tain cells remain comparatively undifferentiated and retain the potentiality of reproduction, it may be accepted.

The third proposition, that effective variation is due to the influence of nutrition upon the determinants contained in the reserve germ-plasm, seems to throw too much stress on the nutrition and environment, too little on the inherent activities of living matter. But if it be regarded as an expression of the fact that all effective variation is a joint product of the inherent activities of germinal cells and the conditioning effects of their environment, it is a self-evident proposition which may be cheerfully accepted.

C. LLOYD MORGAN.

AGNOSTICISM.

A POSTHUMOUS ESSAY.*

AS the Greek word *Gnostikos* means *capable of knowledge*, we may conclude that an *Agnostikos* is, according to the name he himself assumes, a man *incapable of knowledge*. And, because he is incapable of knowledge, he concludes that no knowledge is obtainable. This may be admirable logic, but it is a sorry foundation for a philosophy of enormous pretensions.

It is only because the higher—or, perhaps, it would be more correct to say, the deeper—philosophy is so little studied in England that so shallow a thing as Agnosticism has been so extensively accepted among us. The chief champion of Agnosticism has been

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* The life of William Maccall was uneventful. He was born at Largs (Scotland), and was educated for the ministry. For many years he was prominent in the Unitarian pulpit, and, finding this too narrow, accepted the Rationalist press and platform as opportunities for propaganda. His literary friendships were notable—Professor Wilson, J. S. Mill, and Carlyle among the illustrious list. He commenced his autobiography in the pages of *The Agnostic Journal*, but only reached his college days; he died, disappointed to the last, but with rugged independence unimpaired. His principal works were: *The Elements of Individualism*; *National Missions*; *Foreign Biographies* (two volumes); *Bygone Days* (three volumes from the German); *The Man of Birth and the Woman of the People* (three volumes from the Swedish); *Agents of Civilisation*, etc. In a brilliant volume on *The Newest Materialism* he assailed Spencer memorably. *Moods and Memories* was published shortly before his death, four or five years ago, and preserved some of his best poetry. He consistently refused a Civil Service pension Mr. Gladstone was influenced to offer—no man despised money more than he, even in gaunt adversity. The essay here published for the first time was written shortly before his death and presented to Mr. Charles A. Watts, to whom we are indebted for the manuscript. The reader will find further information on William Maccall in an attractive article by Amos Waters, which has appeared in No. 313 of *The Open Court*.

proclaimed by his enthusiastic admirers the greatest of all philosophers in language—ludicrous from its exaggeration, and pitiable from its imbecility. Verily, the god and the adorers of the god are worthy of each other. This profound thinker made the astounding discovery that the universe is unknowable, is inscrutable. With the recognition of the sublime discovery the whole range of mental speculation is to be revolutionised; all the sciences are to receive new life and grand transformation; politically, socially, morally, religiously, the whole world is to undergo the divinest metamorphosis. But suppose that there has really been no discovery; suppose that from the remotest times men have viewed the seen as the image of the unseen, earth as the vestibule of the skies; suppose that every religion has mystery as foundation and as essence; suppose that every religion claiming to be revealed declares that the revelation simply deepens the mystery—must not Agnosticism, in reference to its leading principle, be spurned as an egregious quackery?

Agnosticism confounds things that have no relation to each other. While vindicating science, it makes a show of patronising religion and of reconciling religion with science. With the Unknown and the Unknowable science has nothing whatever to do. The Unknown and the Unknowable are, for science, the non-existent. As its name implies, science deals with the Known and the Knowable. When it prates of the Unknown and the Unknowable, it uses a meaningless jargon. On the other hand, it is in the Unknown and the Unknowable that religion lives, moves, and has its being. Religion is impelled towards mysticism, just as science is impelled towards rationalism. It is a blunder as monstrous to introduce mysticism into science as to introduce rationalism into religion. A mystical science is a contradiction in terms. A rational religion is a contradiction in terms. Hence Protestant churches, to the extent that they are rationalistic, are not religious. It is in phantasy and emotion that religion has its life, and it is in symbol and rite that it has its expression. In Protestantism phantasy and emotion have slender sway, and symbol and rite are subordinated to dogma. The religious penury of Protestantism is as flagrant as its foe, Ro-

manism, represents it. Dogma had no place in the ancient religions, has none in the deepest Oriental religions; and if that phantom called the Religion of the Future ever takes solid shape, it is by the rejection of dogma that it must begin, and by the adoration of mysticism as the sole source of spiritual sympathy and vitality. The persons called Liberals prophesy the reign of reason, in which God is to be tolerated if content with the fragments that fall from the altar of the goddess Reason. But why should we expect them to be more reasonable than the universe itself, in which nothing is discernible but the action of instinctive force? It is to this instinctive force, the supreme creative energy, that the mystical element in the individual must draw near. In opposition to Rome, Protestantism vindicated the right of private judgment, as if religion were wholly the affair of the cold and barren understanding. Private judgment very soon finds that it can dispense with religion altogether. But, if the individual is convinced that the whole past has significance, and the whole seen and unseen universe has suggestiveness entirely in reference to the instinctive and the mysterious in himself, he plunges further and further into the ecstatic abyss of Intuition. The Panontist, the believer in Instinct as the greater and in Reason as the lesser, is the harbinger of an enfranchisement which may be yet far off, but which is sure at last to arrive.

It is as a genteeler, and at the same time more cowardly, kind of Atheism that Agnosticism is attractive to many silly and superficial mortals. A frank, fanatical Atheist justly demands from us the esteem due to earnestness. But the man who, purely as a dilettante, debates the question of God's existence, must receive from us the dilettante's reward.

Often it is said that the present age is a sceptical age. But no age is sceptical, though one age may be more influenced than another by the sceptical spirit. Men in the mass are always believers, and are the more superstitious the more there is of apparent incredulity. *Skepsis* means deliberation and the discussion which is the result of deliberation. Intellectually it is an instrument, morally it is a mood; but it can never be a system. It does not of necessity imply doubt, and it is never identical with negation. A true scep-

tic is a true thinker; and it is ridiculous to dignify rabid negation ism with the name of scepticism.

In human communities all real growth is moral growth; all rea decay is moral decay. And there is peril to every community i which intellectual progress is not simply the minister of moral de velopment, the food of the moral life. Now, a chief characteristi of our own age is superficial intellectual excitement, which allie itself with other causes in producing moral languor and debility The salvation, the greatness of nations must be sought in the com bined action of holiness and heroism; and if heroism perishes, holi ness must perish too. What depth of meaning there is in the granc Greek saying, that war is the father of all things! How the poin and pith of that saying mock the idolatry of comfort, which is th only religion of the present generation! Religion of a higher, a di viner kind has wholly lost its empire, and has dwindled into a draw ing-room entertainment, diversified by a subscription to a loca charity. The Church of England has immense social power, but no one feeblest throb of spiritual vitality; and the dissenting sect waste their small remaining stock of strength on crotchets and cants Romanism alone has the feeling and the idea of what religion shoulc be, though, instead of marching valiantly and working fruitfully a in the Middle Ages it marched and worked, it cravenly seeks refug in obscurantism as a stronghold. The significance of conflict in th economy of the universe men must again see if again they are them selves to be holy and heroic.

A man of eminent genius discoursed eloquently on hero wor ship, and spent much of his time in denouncing shams. But no on was ever made more heroic by his eloquence, more honest by hi denunciations. The splendid pictorial phrases of the illustriou writer were fervently admired and speedily forgotten. In truth, i we adore heroes, the less disposition have we to be ourselves heroic, for we are led to contrast their bravery and achievements with ou own feebleness. In echoing also him who anathematises shams, what shams we ourselves inevitably become! No, heroism must b inspiration, discipline, action; and, to vanquish semblances, we must ourselves be realities.

But when we behold all around us moral lassitude, moral *asthenia*, moral *Abspannung*, how are we to heal our own moral atony? How are we to grow resolute and bold in the midst of such tragical moral declension? Even our very despairs, however, may be miraculous springs of vigor and courage, for they may lead us to count our own life as nothing, and enable us, in sublime self-annihilation, to do marvellous deeds. But the force of will must be equal to the loftiness of the ideal, and the fire of the enthusiasm, otherwise meagre enough, must be the result. And meagre enough it may be after even our most strenuous efforts, for the time of the world's redemption may not yet be come.

We are not, however, sent by the supernal powers to be heroes, saints, martyrs, prophets, but men. Only when we are hindered, only because we are obstructed, in our free, spontaneous career are we compelled to be, and are we justified in being, redeemers of our race. Novalis, a profound thinker, but often more subtle than profound, has said that we are on a mission—are called to the culture of the earth. But it is as absurd to talk of natural duties as of natural rights, about which Socialists make such a fuss. Both natural duties and natural rights are figments. All that is required of man is to be man: in order to be man, he must be indomitably valiant; and thus the English *manliness* corresponds to the Latin *virtus* and the Greek *andreia*. From courage idealised flow all human goodness and all human greatness. Civilisation has worth, and brings blessing just so far as it idealises courage. This the Greeks at their noblest time and the Romans in their best days clearly saw. And the doctrine had a sublime vindication both in the principles and the practices of the Stoics. Idealised manliness is idealised order and idealised freedom. For the individual who is armed with true manliness seeks freedom only as the condition or preliminary of order.

When does the mystery of the Invisible begin to overwhelm his soul? From the first moment of his existence. The child brings into the world the plenitude of the inner infinite, to which all knowledge and all feeling can never be more than correspondences. It is only by slow degrees that the child can seize the finite: for a

long time external things are to the inner infinite nothing but vagueness. The fundamental fallacy misleading and vitiating all philosophical speculation is the belief that sense is the primary apocalypse to poor mortals. But sense merely seizes something analogous to, or symbolical of, what already exists in the heart—existed there, indeed, even when the child was in the mother's womb. Hence education ought exclusively to be the cultivation of the instinctive element, which, however, is always disregarded, because it is invariably confounded with brutal appetite.

But if the inner infinite, disclosing and unfolding itself through the instinctive element, is more than the chief part of the individual, is verily the individual himself, must not the animating principle of universal nature be recognised as wholly an instinctive energy? Without doubt. But what is lost by the admission? Yea, in sooth, is not much gained? When God is depicted as an Omniscient Being, as an Omnipotent Creator, as Supreme Reason, as a Loving Father, we are driven to ask why there are so many miseries and monstrosities, why the history of the world is nothing but a chronicle of cruelty and crime. It is the Ideologists, the scribblers of Theodicæas, who are the real Atheists, not the Panontists—not they who frankly and gladly avow that there is a God, but deny that there is any proof of omniscience, of omnipotence, of reason, of love, in the sense in which these words are by theologians accepted.

You say that to speak thus is blasphemy; but the charge of blasphemy is so often and so easily brought that small heed must be given to it. It is gross presumption in man to attempt the vindication of God's ways: it is wiser and better to ascertain what those ways are, and to walk in them so far as our strength permits. Compared with the inner infinite and the God there and the outward infinite and the God there, how worthless are human traditions! Yet what but human traditions are all theologies? They are, therefere, interesting no further than they harmonise with our spiritual aspirations and needs. What is good in them we appropriate and assimilate; what we deem bad in them we reject, without, however, blaming our neighbor for taking as spiritual nutriment that which we condemn.

In a country where, according to the French jest, there are a hundred religions and only one sauce, what a wearisome and profitless task it would be to assail that which is intellectually absurd in those hundred religions! If in ignorance, stupidity, bigotry they impede our march to perfection, we thrust them aside without ceremony: that is all. Woe to him who is dominated by the proselytising temper! His craze irritates the whole host of other crazes, and intensifies the contagion and the curse of religious lunacy. A fresh convert is an additional lunatic. When, in defiance of historical testimony, multitudes can be fascinated by the crass notion that the English are descended from the ten tribes of Israel, what hope can there be of the emancipation of the whole people from theological thraldom?

Life creates life, and a divine life is the only infallible evangel: the heroic achievements of the divine life are the only fecund ideas. Suppose that the entire past were to be effaced from human memory, we should still stand in the presence of the universe, and be ready for new and noble action; and from our deeds would spring thoughts which themselves would be deeds. It is from this grander Gnosticism, not from a rickety and ranting Agnosticism, that earth must seek moral impulse and moral sustenance. Doubtless are widely spread in the world, and especially in the English world, the grossest delusions. It is not these, however, which discourage the earnest reformer, but the indifference, the apathy, the coarse materialism, the tyranny of fashion and custom, the insatiable selfishness, the unscrupulous avarice, the social hollowness, the conscious—and, still worse, the unconscious—hypocrisy.

Every earnest reformer in a country whose political might and commercial expansion contrast with its moral degradation, and, what is sadder far, its moral debility, labors and combats as a soldier in a forlorn hope. He is at last driven to feel that his silence may be more potent than his speech, and that he can best be a reformer by ceasing to take the reformer's attitude, and by being as natural as the bird in its song and flight and as the flower in its bloom.

It is the easiest, and yet the hardest, of all things to be perfectly natural; and this is the earnest reformer's perplexity. What

he has chiefly to aim at is not to learn, but to unlearn; and, when unlearning, he may wander into the region of eccentricity. The earnest reformer may become eccentric in the effort to shun eccentricity, and paradoxical in the endeavor to eschew paradox. To be a man, a natural man, he must be once more a child. We might almost say, with a divine teacher who was a son of the people, that he must be born again. After being born again, after living for the second time a childlike life, he can live anew a manlike life, but with more effulgence and plentitude than of old.

There is a cant in these days about solving problems. With solving problems the earnest reformer, in his regenerate existence, has nothing to do. In the universe there are no problems to be solved. But from the great deep of the immensities there are affluences evermore, and it is by bathing in these that the earnest reformer wins new life for himself and his brethren.

We are compelled to regard the earnest reformer as the most victorious refutation of the Agnostics and their pretentious and preposterous gospel. It was said of Malebranche that, while he pretended to see, in accordance with his system, all things in God, curiously enough he did not see that he himself was mad. And, as becometh sciolists, the Agnostics mistake *skēpsis* with an *eta* for *skĕpsis* with an *epsilon*. There are many besides the Agnostics who make the like blunder. As a timid, trimming, twaddling, negationism, as a deification of the privative alpha, can Agnosticism honestly demand from us any serious consideration?

Over and over again in the world's history the only argument against sophistry has been moral revolt, though often this moral revolt has been limited to the solitary voice of the prophet. Even for the most fervent prophet, however, the most earnest moral reformer, battling with Agnosticism, can seldom be more than a *skiamachia*, a fighting in the shade, a fighting with shadows.

Positivism, as its very name implies, has positive principles. The originality, as well as the verity, of these has been questioned by Saisset and others. But they offer points of assault: we have something to assail, and we know what we are assailing. With the privative alpha of Agnosticism, however, how can we grapple?

When the tiny cherubim, with wings and head, but no body, were asked to take a seat, they replied that they had no wherewith. Now, it is the lack of a wherewith which makes Agnosticism invulnerable. We cannot smite its head, for it has none; we cannot seize its wings, for it has none; we cannot kick a more solid part, for it has none. Our good friend, therefore, the prophet—the earnest reformer—has a tough job of it when striving to vanquish, by sheer moral eminence, beautiful moral effulgence, the dreary drivellers who glorify themselves with the name of Agnostics, though Agnoetists would be a more suitable designation.

Yet, though they knew it not, the instinctive element seems to have inspired them in the choice of a name for their supreme cretinism. The Greek verb *Agnoeo* means to be ignorant of, not to notice or to know. *Agnoema* means error. *Agnoia* means ignorance. *Agnosia* has the same meaning. *Agnomoneo* means to be ungrateful, to be or to act without sense or consideration. The second part of this definition is explicit enough; by the first we learn that Agnosticism steals ideas, but does all it can to conceal the theft. *Agnomonos* means foolishly; *Agnomosune*, ignorance, inhumanity, unskilfulness, imprudence, perverseness. He who is *Agnomon* is not merely without judgment, unjust, but possibly without the teeth, *Gnomones*, by which the age of animals is ascertained. But the Agnostic, though destitute of the teeth of wisdom, may deem the tongue of unwisdom a compensation. To the Greek *Agnostos* the Latin *Ignotus* corresponds. Both words mean *ignorant* as well as *unknown*.

But, gentlemen, if you know nothing, why should you worry and weary us by your idiotic cackling? Newton and other great men have, in beautiful modesty, made light of the knowledge which they have gained by the toil and the thought of long years. You, the Agnostics, obstreperously declare that you know nothing, yet talk and act as if you knew everything. If you had the faintest perception of the comical, you could not fail to see that the man who says that nothing can be known, and yet parades his own omniscience, is only fit to figure in a comedy.

Agnosticism is saved from being the most contemptible of frauds

by being the most ridiculous of farces. And it is not the less both a farce and a fraud because some men of undoubted scientific ability have given it their countenance. They have been induced to do so chiefly from the desire of tripping up Orthodoxy, instead of smiting it frankly in the face. Besides, Orthodoxy, so far as it meddles with science, is itself a species of Agnosticism : the less it is acquainted with science and scientific evidence, the more authoritatively, oracularly it speaks on scientific subjects. This also has its comic aspect. When a famous, but eternally blundering, statesman, not satisfied with ruining his country, went back to the dawn of creation to show of what impudent feats, of what silly freaks, his sophistry, sciolism, arrogance combined could be guilty, the more there was the pretence of instruction and edification the more the laughter of the beholder abounded. But the famous statesman, lacking humor and blinded by self-idolatry, was at a loss to discover what the essence of the joke was. It is an axiom of Orthodoxy that the less a man knows the more competent he is to pronounce on points of evidence and faith. Thus a great scholar like Gesenius, who devotes his whole time to the Oriental languages, and especially Hebrew, is not worth listening to when he tells us when and in what circumstances the various books of the Old Testament were written : the only man deserving heed is the young Anglican curate who is ignorant of Hebrew, and whose chief training has been in the cricket-field !

Agnosticism could not have been accepted in science unless it had been already accepted in theology. Bruno Bauer, in his valiant book on "Christ and the Cæsars," has demonstrated that what are deemed conflicting currents are really portions of one mighty stream, and that Roman Stoicism and Apostolical Christianity had essentially the same aims. And, as if destined to be not enemies, but coöperators, Jesus and Seneca were in the strictest sense contemporaries, Seneca having been born in the second year of the first Christian century. We find that in every age there is one primordial oceanic rush. The leading characteristic of the eighteenth century was Illuminism. At the close of the century the light grew lurid and broke into maddest lightnings. Except in regard to its Illuminism, never can the eighteenth century be properly studied. All

were Illuminists: the Freemasons, the members of secret societies, the founders of sects, the Encyclopædists, the charlatans so numerous, the scoffing Deists, the rabid Atheists. John Wesley was an Illuminist no less than Cagliostro. Voltaire no less than Swedenborg, who, absurdly enough, has by Emerson and others been called a mystic, whereas, as a visionary, he was the strenuous foe of mysticism. Illuminists were the cynical Frederick of Prussia and the filthy Catherine of Russia. Its Illuminism was, in the main, generously placed at the service of humanity; and ever should humanity be grateful for the aspirations and achievements of the greatly decried and greatly misrepresented eighteenth century. Everything was thorough and vast in the eighteenth century, its crime and its blackguardism not excepted. Fearless was falsehood, and fearless was also the hostility to falsehood.

As if exhausted by the Napoleonic wars, the nineteenth century has had no life apart from science and its colossal and manifold and miraculous applications. But the impulse to scientific development has come from the pressure of mechanical necessity, whereas the Illuminism of the eighteenth century sprang from the instinctive element. It is the absence of this instinctive element that marks the nineteenth century, which might fitly be named the century of Externalism. But it is the language of Externalism which Externalism deems a befitting to employ: hence boundless confusion in action and in speech, and hence the stamp of mediocrity on everything.

The true, the divine community is a congregation of instinctive individualities. But these exist not: therefore the true, the divine community is a thing of the future, or, perhaps, simply an unrealisable dream. In these days the only art which has been perfected is the art of association. Not however by the elevation, but by the annihilation, of the individual has the perfection been gained—the sluggish slavish surrender of the individual to a gregarious tendency. A Socialist sect is founded, and a joint stock company is formed from the same motives and in the same manner. One of the most lucrative occupations is that of a corporation, and, so far from involving any danger, it is the surest and swiftest road to influence

and fame. The conspirator enters as calmly on his work as if he were taking a share in a coöperative store. A nice, genteel profession is that of a conspirator; and, even if his schemes fail, how must the vanity of a conspirator be gratified by seeing a prime minister crawling at his feet! If the trade of a conspirator does not suit you, try your hand as the leader of a strike. As effectually as a conspiracy, a strike effaces, slays the individual, and exalts, deifies Externalism. From the time when Robert Owen first proclaimed his doctrines, coöperation has marched with gigantic steps, but always in the direction of anarchy. In pleading zealously for cooperation and possessing himself in a high degree the genius of organisation, Owen contended no less earnestly for the doctrine of circumstances—that is to say, for fatalism in its very worst form; forasmuch as man, so far from being the creature, is the creator of circumstances. As coöperation has gained sway, just in the same measure has fatalism extended, and from fatalism hath come anarchy, and from anarchy hath come death. Anarchies neutralise anarchies, and the neutralisation is called government.

Religion should here be the main vitalising and harmonious force; but it was with religion itself that the anarchy began. The anarchy, however, religion strove to conceal by multiplying coöperative agencies. The more also the fables of theology were thrown to the lumber of the past, the readier theology was with new fictions and new phrases. When religion has degenerated into the tradition of a tradition, it is bewildered what to do to prolong its empire. As the forerunner of Agnosticism, the religion of the nineteenth century said that we must admit mysteries, but not regard them as intrinsically unreasonable. As, however, the mysteries of theology are traditional mysteries, they are not properly mysteries. Mystery is that only which presents itself spontaneously to the innermost soul of the individual. And every man's mysteries are incommunicable to every other man. If it is foolish to talk of traditional mysteries, it is fatuous to speak of natural law in the spiritual world. There is no law in nature; and the slang about law in nature is on a level with certain doctrines and sayings of the mediæval schoolmen that have long been discarded. The crazes and phrases of the

mediæval schoolmen went far in the direction of bathos; but they are preferable to the crazes and phrases of theological and scientific Agnosticism in our own day. When we listen, for example, to discourse about the survival of the fittest, we ask whether this means anything except that what has survived has survived. For, otherwise, it is exactly the unfittest things which survive; the noblest, most beautiful things which perish.

At the close of a Panontistic homily, or Panontistic rhapsody, or whatsoever the reader may choose to call it, we leave the reader to draw his own deductions, make his own applications. What the reader might deem the protest, the proclamation of a solitary man, is really the confession of a life's experiences. It is questionable whether literature in these days, unless it takes the shape of confession, has any value. The confession of a man who from his earliest years, from his very earliest remembrances, has gone deeper and deeper into the inner infinite of his own breast, and who has nothing to offer but the treasures gathered in his interior journeys, may lead some lonely brother to make the life within the divine life for himself and a redeeming power for others. Recently Theosophy and Mysticism have found exponents; but in the exposition it is always assumed that, if any progress is to be made in the mystical life, Jacob Boehme and many kindred writers must be diligently consulted, assiduously studied. It is our ambition to show a better way. Far less is it our desire to make war on Agnosticism than to lead earnest and devout souls to a realm remote from sects and systems—the realm of sweetest, most sacred feeling, and of richest phantasy; the realm of ecstatic instinct, in which he whom we call God himself dwells.

WILLIAM MACCALL.

AUTOMATISM AND SPONTANEITY.

IN the mediæval world man's longing for close communion with the powers that underlie creation was readily satisfied. His terrestrial dwelling-place with its starlit vault he believed to be the universe; and himself, as immortal soul, the supreme concern of God and the Devil, of all the hosts of heaven and all the imps of hell.

What humiliating shock to this fondly nurtured self-importance, when—at last convinced by science—modern man found himself standing amid infinity on the thin crust of an inferior orb, whirling at a tremendous speed round and round one of the myriad suns that people unlimited space.

Worse still, he had to learn that all the wondrous happenings of nature, hitherto attributed to the volitional fiat of creating agents, and held to be taking place solely for his own sake, were in reality the rigorously necessitated outcome of mechanical laws that had been in operation since the beginning of things.

Under such mechanical dispensation, extending into abysmal space and over ages upon ages of time, what then was he, diminutive earthling, with his little span of life?

As corporeal being the constituent particles of his organism were thus fated to obey the same undeviating laws that govern the figurations and motions of inorganic bodies. And this necessarily implies, that all vital activities, so-called voluntary movements included, result—beyond his volitional control—from the strictly determined play of mechanical impact.

As a percipient being he was merely passively mirroring what

in reality was occurring outside of him on this planet or in the boundless universe. Mind and body, he was but a tuneful instrument constructed and played upon by external powers.

And though Leibnitz, whose teachings gained the ascendancy in some quarters, conceived the percipient soul as an entelechy or self-acting entity, yet as such it was likewise only reproducing within itself in a representative way either innate ideas, or the orderly events of an independent outside world.

Despite a life of growing experience, filled with thrilling emotions, self-determined volitions, and vaunted deeds, we were shown in the light of science to be only so many conscious automata, only marvellously intricate appendages to nature's all-comprehending mechanism.

It is true, under the sway of the mechanical philosophy, and mainly in reaction against its materialistic tendencies, our sensations were proved to be the veritable elements out of which the world we perceive is actually formed. And it is now commonplace of philosophy, that what we call the sweetness of a thing is only the quality of sweetness belonging to our own sensation ; and what we call the thing itself only a compound of our own visual and tactile impressions.

Berkeley, as we all know, on the strength of such reasoning, and to the inexhaustible merriment of his contemporaries, denied altogether the existence of an outside material universe. For if the world we actually perceive is out and out composed of mental ele ments, what need of another second world materially subsisting beyond such perception? Consequently, according to this view, percepts are the only constituents of the world, and its so-called objects are mental phenomena and nothing else.

Yet, even then, these percepts of ours, constituting a world of purely ideal consistency, were not believed to be products of our own making, but only flashed upon our mind by a corresponding volitional fiat of the Deity. Man, consisting thus simply of a percipient mind, soul, or spirit, was here again only passively and representatively mirroring that which was being fashioned and actuated outside and independently of himself.

In the light of Berkeley's idealistic interpretation, man has to be conceived as a mere receptive *tabula rasa*; as a kind of potential camera obscura; in fact, as an invisible perceiver, whose visible embodiment is being continually composed of divinely emanated ideas, and who is disporting himself in a perceptual world composed of the same immaterial stuff.

It has been asserted by eminent authorities that Berkeley's reasoning is flawless. But is it not a sufficient *reductio ad absurdum* when such reasoning necessarily leads to the conclusion, that our persistent seeming body consists in reality of divine ideas flashed in fitful gleams upon our percipient mind, and belonging therewith no more intimately to ourselves, than to any other being who may likewise happen to perceive it?

This wildly speculative conception would seem to unsophisticated minds all too fantastic to be seriously entertained. But as thoroughgoing Idealists do not shrink from accepting even this extravagant outcome of their theory, the exact flaw in Berkeley's, as indeed in all purely idealistic reasoning, shall be definitely pointed out in the course of this discussion.

The sensation-philosophy, this psychological counterpart of the mechanical theory, with its pseudo-mechanical grouping of sensorial elements, consistently and unflinchingly expounded by Hume, stranded him inextricably, and to the great scandal of an illogical world, amid a matterless, soulless, godless, meaningless phantasmagoria of nothing but actual and remembered sensations.

No wonder that, under such complete ratiocinative volatilisation of our inner and outer being, and of everything besides, fervent souls were more than ever driven to seek communion with the perpetual powers through the ancient channels of direct emotional blending or of intuitive apperception.

Science, however, overrules mere emotional or intuitive yearning. With its logically consistent interpretation of carefully verified facts it carries intellectual conviction to all willing and capable of following the light of reason in its application to natural phenomena. Stimulated by the marvellous progress made in the interpretation of such phenomena under the sway of the mechanical theory, science

has been persistently striving to extend its mechanical dominion over all natural occurrences whatever.

The truth, that is, the full objective validity, of the mechanical theory once admitted, sound logical reasoning feels irresistibly compelled to look upon the course of nature in its entirety and in its minutest particulars as inexorably foreordained. Such course is then unalterably resulting from the primordial cast, from the initial positions and velocities of the elements that are obeying the mechanical laws. Or, otherwise expressed, all formations and activities in nature are then, and have ever been, the product of a definite amount of indestructible mechanical energy at work among the definite number of inert and indestructible elements that compose the substance of the things of this world, our own body among the rest.

All consciousness, all our sensations, thoughts, emotions, and volitions have, consequently, to be considered as a mere ineffective by-play to this purely mechanical actuation.

In vain do our philosophers seek to avoid this unavoidable conclusion. If the mechanical theory is—as generally *scientifically* believed—a correct interpretation of the actual state of things, then, inevitably, we ourselves are but conscious automata, with no power whatever to influence the course of nature, our own movements not excepted.*

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* That out-and-out Automatism is the final verdict of a consistent interpretation, in accordance with our present mechanical science, has again and again been conceded by foremost scientific thinkers, from Descartes, Leibnitz, and Huygens to DuBois-Reymond, Helmholtz, and Wundt. Quite recently Haeckel, in *The Monist*, (Vol. II, No. 4, p. 484), does not hesitate to declare: "The so-called 'freedom of the will' is apparent only as each single volitional action is determined by a chain of precedent actions, which ultimately rest either upon *heredity* (propagation) or upon *adaptation* (nutrition) As these last are ('mechanically') reducible to molecular motions, the same holds true of the former."

More explicitly still: "The general science of nature assumes that in the whole world the same great, unitary, uninterrupted, and eternal course of development takes place, and that all natural phenomena without exception, from the motion of heavenly bodies and the fall of a rolling stone to the growth of plants and the consciousness of man, are governed by one and the same great Law of Causation;—and that all are ultimately reducible to atomic mechanics." (*Wissenschaft und freies Leben.*)

That even "the consciousness of man" is reducible to atomic mechanics, is more than most believers in the mechanical theory would admit. Haeckel, how-

If, on the other hand, we are—as we all *practically* believe—capable of directing our movements at will, and of thereby influencing the course of nature, then, most certainly, the mechanical theory is not a correct interpretation of the actual state of things.

There is no escape from this alternative. It has been the great standing dilemma ever since Gassendi revived the atomic theory and Descartes enunciated thereupon his dualistic world-conception: within us a mind filled with ideal phenomena; outside of us a realm of mechanically actuated matter; and no rationally conceivable interaction between the two.

Our own scientific thinkers are far, as yet, from having reached a sound monistic solution of this central problem. In fact, Du Bois-Reymond, with a full understanding of the import of mechanical necessity and a belief in its validity, has pronounced it insoluble. Professor Huxley, as a consistent *scientist*, is driven to admit that

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ever, does not take the consciousness of man to be altogether an outcome of mechanical motion. Indeed, in his view it is hard to discover any connexion whatever between consciousness and atomic mechanics. For he endows the mechanically moved atoms or molecules with mental qualities. And this involves among other incongruities an utmost Dualism in nature. In fact, the same irreconcilable Dualism that has confronted thinkers since Descartes's time: Two parallel-running worlds, the one material, the other mental, and no possible efficient interaction between the two.

To call this thoroughly dualistic conception, nevertheless, "Monism," simply because no supernatural agencies are invoked, is surely to mistake its essential philosophical character. When Haeckel, moreover, declares that he regards all matter not merely as "besouled, that is to say, endowed with feeling," but endowed also "with motion, or, better, with the power of motion," he fundamentally upsets the entire mechanical world-conception he professes to uphold. For it is of the essence of the mechanical view that all motion be imparted from outside to inert matter. As Leibnitz already knew: in the mechanical order "*un corps n'est jamais mû naturellement que par un autre corps qui le presse en le touchant.*" Anything endowed with intrinsic power of motion would antagonise the mechanical order by introducing into it an incalculable, newly and spontaneously arising amount of energy.

Besides, by identifying "mind" with "force," by taking mind, as well as motion, to be a force-emanation, Haeckel's *Principles of a Consistent Unitary World-View* lead to further confusion. Mental states, as such, are utterly forceless, wholly devoid of mechanical momentum, and cannot, therefore, be a manifestation of force. They do not enter into the concatenation of mechanical activities. They are incapable of moving matter. They have no place in the mechanical theory.

These remarks are advanced to show what profound inconsistencies have yet to be cleared away in order to arrive at a "consistent unitary world-view."

the conscious-automaton-theory is indeed the necessary outcome of the mechanical view. As a *philosopher*, however, he resolutely shakes off the mechanical shackles and alights by means of a miraculous *salto mortale* a full-fledged Idealist into the opposite domain of inwardness. And Mr. Spencer, with his wonted many-sidedness, essays in vain sundry contradictory modes of overcoming this same dilemma.*

We desire to find explained, how in a world in which all change of position is held to be the strictly conditioned outcome of previously disposed and externally acting forces;—how in such a world it is possible for us to direct our movements by dint of intrinsically originated volition, becoming thereby enabled purposively to influence the otherwise rigorously necessitated course of a nature not forming part of our own being.

In the presence of the multifarious results of our nature-influencing capacity, it is nothing short of scientific fanaticism to profess disbelief in this power of ours over nature. For the sake of

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* If Mr. Spencer's reasoning were throughout logically consistent, instead of eclectically latitudinarian, it would compel him, as well as Professor Huxley, to accept without compromise the mechanical view. The material universe with its "physical modes of force" preceded in the course of evolution its mental realisation. Mr. Spencer admits that the mechanical interpretation is the correct interpretation of physical phenomena. And with an adequate understanding of its implications he further admits that matter itself is inert, and that its ultimate units are devoid of any qualitative distinctions. All qualitative distinctions in nature must, consequently, be due to mere difference of arrangement. Mr. Spencer himself asserts: "The properties of the different elements result from differences of arrangement, arising by the composition and recomposition of ultimate homogeneous units." This is, as Mr. Fiske emphatically corroborates, the Spencerian view of material phenomena, when these many-sided savants are speaking from the side of the physicist. And it is undoubtedly the mechanically correct view.

Wundt, in his *Theory of Matter*, emphasises likewise the same well-founded mechanical principles. He says: "The entire development of physical atomism points to the derivation of all qualitative properties of matter from the forms of motion assumed by the atoms. The atoms themselves are thus necessarily completely devoid of quality."

Inert, absolutely rigid, qualitatively and quantitatively undistinguishable elements, driven into sundry changeful arrangements by externally impelled modes of motion; this, and no other, is the veritable mechanical world-material. And thinkers who accept the mechanical theory are logically debarred from the device of endowing their atoms with any sort of qualitative property, or with any in-dwelling "power of motion."

intellectual integrity it will be well to keep this most essential philosophical problem clearly in sight until rationally solved.

The thought of the eighteenth century—swayed partly by mechanical materialism, partly by the sensation-philosophy, or in Germany by the Leibnitz-Wolffian compromise—was in all its phases essentially fatalistic, making of man an utterly powerless vehicle or plaything of strictly predetermined conditions.

Those among us, whose philosophising is running riot in the sphere of unimpeded idealistic licence, or who amid an overwhelming flood of contradictory philosophical opinions have lost the moral hold on logical consistency, can hardly imagine how helplessly fettered human consciousness felt by those rigid automatic theories of existence. Under such paralysing influences the transcendental idealism of Kant, however soberly guarded it may now appear to us, was hailed as an awakening from a profound lethargic slumber, as a joyous deliverance from the mechanical and dogmatic incubus that had so long oppressed human self-confidence.*

Kant convincingly taught that we are not merely perceptive mirrors, passively reflecting the marvels of an outside nature. But that, by dint of formative and constructive powers inherent in our own being, we ourselves fashion out of incoherent, sense-given data the entire world we are conscious of. And he taught, moreover, that, however much we may bodily and mentally be involved in the purely mechanical course of nature, our innermost being possesses, notwithstanding, the power of freely bending this otherwise rigorously necessitated course in conformity with the dictates of our moral ideal.

Ethical freedom, manifesting itself in intrinsic spontaneity of action—held however to be derived from a supernatural source—is what constitutes the central principle of the Kantian philosophy.

* This is what, among many other kindred expressions from contemporaries, the celebrated physician and philosopher Erhard has to say about the impression made upon him at the time by Kant's teaching: "Reading his works I shed tears of utmost joy. They made me realise myself as a rational being. I am who I am. No other person keeps control of my duties, or can do my thinking for me. The world I perceive is the problem for my knowledge; my inner feeling of freedom alone the judge of my worth. And this I owe to thee, my master, my spiritual father."

And it is the principle that has mainly inspired the speculative systems which since that time have followed one another in such profuse succession.

It is this same nature-transcending principle of intellectual and ethical spontaneity, admitting on its inward side to close communion with a supreme Intelligence, and on its outward side empowering human beings rationally to transform the sense-apparent world ;— it is this same principle of spiritual freedom that with its thought-woven mirage is delusively alluring to the desert wastes of pure Idealism our numerous Neo-Kantians and Neo-Hegelians, our Transcendentalists and Theosophists.

It may be now fully admitted, without fear of serious contradiction, that whatever we are conscious of must, as such, necessarily be wholly a product of powers inherent in ourselves, and can by no means be a passively mirrored image of something existing outside of us.

Percepts arise in us in a compulsory manner. We generally attribute their origin to the things or objects we perceive as existing outside of us. But it is clear that the things or objects we are thus actually perceiving are products of our own perceptive faculty, are indeed the percepts themselves, and, as such, constituents of our own consciousness. Such percepts can therefore not possibly be—as generally believed—products, effects, or copies of the things or objects perceived ; for they are themselves these very things or objects perceived.

The entire wealth of our conscious world is wealth inherent in ourselves, constituting thus—as may be in a certain sense admitted —a gradually accruing self-revelation of that inmost nature of ours, which abides beyond the play of conscious states.

We have no immediate knowledge of this innermost being. That which we are immediately cognisant of is the product of its activity, the outcome of its shaping faculty, a becoming conscious of so much of its present manifestations.

In this light, all things or objects dissolve into fluent products of unremitting activity. And if the things or objects we thus perceive are—as maintained by Idealism—the real things or objects of

this world, then things or objects have no substantial, self-contained existence, but are altogether rainbow-like phenomena, produced and sustained from moment to moment.

It is incontestable that we are immediately conscious of nothing but a succession of most complex, ever-changing, ever-dwindling mental states, arising from the depths of our hidden nature. Or, if pure phenomenalism deems it an as yet unwarranted assumption to assert that the conscious phantasmagoria arises from our own hidden nature, we are left with nothing for philosophical contemplation but the conscious content itself, or that which is directly revealed as conscious phenomenon.

The correct analysis, the rational interpretation of this conscious content will yield the true world-conception. All divergence of philosophical opinion is due to divergence in the interpretation of this single fact of world-awareness, of that, namely, which is consciously present. Into conscious presence is re-collected all past experience, is re-membered the totality of world-realisation.

The ever-changing conscious content reveals itself as the product of some kind of activity. And as, on account of its evanescent, ever-renewed existence, it cannot be conceived as self-actuated and self-created, it has to be conceived as an outcome of the activity of some agency not forming part of its own transient states.

Kant assumed that the producing agent of the conscious display is intelligence. And it is this purely idealistic position that has been so vigorously defended by Fichte and Hegel, and by their followers to the present day. According to this view, intelligence, and intelligence alone, is the creator of all world-phenomena, such phenomena having their existence solely in the conscious activity of this intelligence.

Kant, it is true, had taken for granted the existence of a world of things-in-themselves, affecting our sensibility, and filling it with the material made use of by intelligence in its world-construction. But it is clear that nothing can possibly enter the conscious content from an outer world. Its sensorial and perceptual, as well as its conceptual phenomena, are all in all constructed by whatever produces and sustains it from within. Therefore, if intelligence is

really the producer and sustainer, then intelligence is the only efficient power in world-construction, and the assumption of a realm of things-in-themselves is wholly gratuitous.

From the idealistic standpoint it is a mere delusion to believe that our senses are affected by anything existing outside the conscious content; for in verity there is no outside to it. All that consciously takes place in the world has its being in one and the same conscious content. This statement, when its meaning is fully realised, is indeed self-evident, admitting of no appeal.

But here the contrast involved in the idealistic view and in that of common sense, as seemingly revealed by perception, becomes strikingly apparent. Our individual being is generally held to be contained in what we call our body. And, moreover, it appears pretty evident that our entire consciousness is in some way an outcome of the activity of that particular part of the body we call our brain.

Now, when our body is consciously realised it often forms only a circumscribed and minute part of the entire world then consciously present. For instance, I at present perceive my body as a minute object within a vast landscape, consisting of a multiplicity of objects, and among them beings like myself. If the idealistic view is correct, if the percepts themselves are the real existents of this world, then our body—usually believed to be the bearer of the entire conscious content—forms, in fact, only an insignificant part of it. Consequently, instead of the conscious content originating within us individually, we, on the contrary, originate body and mind within the conscious content;—indeed, originate therein only as a comparatively insignificant part of it. It would follow therefrom that the conscious world we realise is the product of powers not forming part of ourselves. For our body, being only a circumscribed phenomenon among many others in the conscious content, this all-containing conscious content cannot possibly be a product of this or any other part of itself.

For the same reason, the conscious content, idealistically conceived, can neither be individual self-realisation, as Fichte had maintained, nor can it be an auto-cosmos, as the hylo-idealists will

have it. In fact, no sort of Solipsism is admittible under the idealistic assertion, that the conscious content is self-significant reality. The legitimate outcome of the idealistic position is objective Phenomenism.

The idealistic view in one form or another has got such firm hold on many of our foremost thinkers that it is by no means a waste of words to point out its unavoidable implications.

The conscious content, of which we ourselves bodily and mentally, together with all other things of this world, are integrant parts, arises as a fluent phenomenon interruptedly and in fragments. It emanates as an ever-renewed, transient creation from a hidden matrix. This evident fact has led eminent thinkers, like Plotinus, Boehme, Spinoza, Schelling, and others, to declare that the source of existence is in its inmost nature unconscious.*

The phenomena of consciousness arise from a matrix not itself revealed in the conscious content among its constituent parts or states. Kant's "intelligible ego," which, as he maintains, never becomes an object either for the inner or for the outer sense, is an acknowledgment on his part of the existence of such an unconscious, or rather imperceivable, matrix. "Intelligence" or "Reason" are clearly only generic names given to the *conscious activity* of this hidden matrix. But such activity is not itself the matrix, as our Neo-Kantians and Neo-Hegelians are anxious to establish, in order—as Professor Caird asserts—to assimilate "man as spiritual with an absolute spirit."

Philosophy has thrown as yet no genuine, steadfast light on this obscure problem. Thus far we cannot say that the analysis of the conscious content has revealed the nature of the matrix whence it emanates. For it emanates just as little from any peculiar grouping of mechanically driven material particles, as from a purely spiritual activity.

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* "The eternally Unconscious—that which constitutes the eternal sun in the realm of spirits is hidden by its own exceeding light; and though it never itself becomes an object, yet impresses its identity on all free actions;—this eternally Unconscious is at the same time the same for all Intelligences, the invisible root of which all Intelligences are mere factors." *Schelling* (*Werke, Ab. I, B. 3, S. 600*).

Let us, then, once more attempt to discover given data, that may help us to more positive conclusions concerning this inmost nature of our being. Such critical examination may perhaps at the same time enable us to overcome to some extent the central dilemma of matter and spirit, of automatism and spontaneity, of mechanical necessity and non-mechanical or so-called free causation.

No thinker, save an absolute Solipsist, will deny the existence of beings like himself. We have, however, seen why the solipsistic standpoint is logically untenable. There is, therefore, logically nothing to debar us from admitting the existence of beings like ourselves. We ask, then, how do we, and the Idealist among us, get to realise such existence? The latter cannot rightly maintain that he realises, for instance, the existence of his friend, as a purely ideal existence. He has absolutely no direct knowledge of the ideal nature of his friend. He is not in the least directly cognisant of his friend's sensations, thoughts, emotions, and volitions. These form in no way part of his own conscious content. What he is directly cognisant of, is the percept he calls the body of his friend. And it is solely by dint of perceptual or bodily signs that he indirectly infers that his friend is also a conscious being like himself.

It is undeniable, then, that his friend's ideal nature has no power whatever to affect the Idealist's perceptibility, so as to make itself directly known to him. It is incontestable, on the other hand, that his friend's non-ideal, non-conscious self has power to affect his perceptibility in most specific and distinct ways, so as to become directly known to him as the group of definite percepts he calls his friend's body.

Let us keep clearly in mind that nothing mental has power to affect the perceptibility of beholders, and that what is called our body is only a group of percepts in the conscious content of such beholders. It follows that our veritable self, the hidden matrix whence our consciousness arises, is of a nature altogether differing from anything manifest as mental or material. It cannot be like any of the mental phenomena casually found in our conscious content, not even like reasoning, or willing, or any activity we are directly conscious of. Neither can it be like the group of percepts

arising in the consciousness of him who perceives us, and which we call our body. It is consequently neither of the nature of mind nor of that of body.

It is, however, unmistakably, an existent that has power to arouse distinct perceptual realisations of itself in the consciousness of beholders. And it is an existent that is also the bearer of its own conscious content. It therefore has a nature incommensurably transcending in efficiency and import the group of percepts we call our body, as well as the group of other conscious states we more particularly call our mind.

Should the interpretation here given, despite its denial of the substantial existence of matter as a *perceived* entity, be nevertheless decried as "materialistic," there will be no objection raised to the use of this much-maligned term. The view here advocated is, indeed, essentially materialistic. Only matter must then be defined as that which affects our sensibility, awakening thereby definite percepts in our conscious content. And the usual mistake of looking upon the awakened percepts themselves as material objects must be avoided. For these are mere transient symbolical representations of the actual power-emanating existents. As such they form marvellously distinct and specific, yet wholly inadequate mental pictures. Looking at a brain, for example, how can the transient percept momentarily awakened in our consciousness, and consisting of nothing but differently colored surfaces, how can such a mere symbolical picture adequately represent the real existent, which science proves to have been most toilsomely elaborated during untold ages, and which contains all the gathered results of such elaboration?

And, as regards the functional activity of this highest achievement of material elaboration, how can its true import be at all realised merely by means of molecular agitation perceptible within its mental image? We know, however, that this same activity, which manifests itself to an outside observer as mere molecular agitation within his own percept, means incommensurably more to him whose brain is thus functionally active. Through such functional activity his world-revealing conscious content emanates from the inscrutable depths of his all-comprising being.

This being, though not itself of the nature of mental or conscious states, has such states as a functional outcome of some of its specific activities: and though not itself of the nature of *perceived* matter, has power to awaken material percepts by affecting in specific ways the sensibility of beholders.

The realistic implications involved in this unmistakable state of things are almost universally shunned and dreaded. But are not the true facts of existence more profoundly marvellous than any fanciful conception of ours?

Our transient and forceless conscious content being but a functional outcome of the activity—not of what is perceptually known as our body and its brain—but of that hidden self of ours which awakens these definite percepts in beholders: it follows that this hidden self is more fundamental, permanent and essential than any of its own mental states, or any set of percepts it may awaken in beholders.

In the light of what has been stated, it will not be difficult to realise that when I move my arm I cannot rightly say that the mental state I am conscious of as my volition has moved my arm. Nor can I say that the percept in him who witnesses the performance, and which he calls my body, has moved my arm. Both these modes of realisation—my own inner consciousness of the act and the beholder's outer consciousness of it—are but mental symbols of the activity of my veritable being, my being which steadfastly abides beyond all conscious realisation.

Having thus but a symbolically inferential knowledge of activity, and but a symbolically inferential knowledge of that which is active, it is no wonder that the activities of volitional movements, and analogically, that of all other motion in nature, is so strangely enigmatic.

That much however may be clearly ascertained—namely, that no kind of activity is purely mechanical. What Newton called the [illegible] in immediate contact is to the mental plane a part of its total [illegible] and by far the most important part in nature.

The peculiar modes of reaction, or active resistance or [illegible] response opposed by different kinds of matter to external impul-

sions, evinces the existence of specific indwelling powers. And it is these powers that underlie the perceptually realised qualitative properties of material compounds.

A wonderful amount of mathematical and physical ingenuity has been vainly expended by eminent scientists in order to bring reactive modes of motion under strictly mechanical laws. Elasticity, cohesion, chemical activity and union, gravitation, magnetic phenomena, muscular contraction, one and all have been tortured upon the mechanical rack without yielding the secret of their specific modes of activity.

To choose an extreme example of non-mechanical actuation, who can soberly contend, (though there have been mechanical enthusiasts that have gone even that far,) that the development of the chick in the egg is caused by the heat-motion imparted to it from outside. Is not the rigorously preconcerted rearrangement of the constituting material, which results in the formation of the chick, governed by most specific affinities inwoven in the reproductive germ?

During vital activity material elements are forced by compelling influences, emanating from the functioning substance itself, to fall into definite molecular arrangements. They are not forced to fall into such arrangements by dint of motion imparted from without. The functional agitation of the living substance is therefore not of the mechanical order.

In closely observing the functional activity of living substance it becomes visibly and unmistakably manifest that such activity is not of the mechanical order. It is not caused by the transfer of energy through mechanical impact. The constituent elements of the functioning substance are not driven together or asunder by externally imparted impulsion. What takes place on stimulation is, first, a chemical rupture, a so-called explosion, under which a definite organic molecule is severed from the original chemical totality of the substance acted upon. In consequence of this encroachment from outside a reaction sets in, spreading over a more or less extensive portion of the living substance, and resulting in a complete reintegration of its disrupted chemical totality. The living

substance restores its integrity by force of those most specific chemical affinities through which it is itself constituted. These enable it to fill the chemical or functional gap with complemental material assimilated from outside.*

The peculiar chemical or molecular constitution of the living substance is that which distinguishes it from other substances. And it is only through strict maintenance of this most definitely specific constitution that one kind of living substance is distinguished from another. Their reproductive germs, though microscopical and apparently all but homogeneous, contain evidently already with utmost faithfulness the distinguishing molecular traits.

Science has conclusively proved, that such marvellously specific and high-wrought chemical or molecular constitution is the result of endless elaboration. How then can the functional agitation of the living substance which aims at specific reintegration upon outside encroachment be of a mechanical nature? How can we feel justified in looking upon a molecular agitation which is directed with most punctilious selection by specifically ingrained chemical affinities as belonging to the mechanical order? Because we have experience of mechanical modes of motion, or rather because by excluding from consideration the specific constitution of bodies, and taking into account only their masses, we can reduce the motions imparted to them from outside to mechanical laws, it is vaguely hoped that these

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* For calling this vital reaction and more especially that occurring during functional activity in the brain of higher organisms hyper-mechanical as I have done on former occasions, I have been censured by the Editor. This occurred probably under the impression that I meant by "hyper-mechanical" some super-natural agency here at work, while I only meant specific modes of motion originating from within and transcending in efficiency any possible kind of mechanical display. The Editor himself is inclined to believe in activity originated from within. Such activity he will surely not call mechanical. For it is of the essence of mechanical activity that the acting substance as such be inert and that all activity be imparted to it [illegible].

The arguments in this discussion do not apply to physicists who employ a working-hypothesis other than the mechanical. Such, for instance, as attribute to the material elements whatever attracting or repelling energies their calculation requires. Or such as discard all realistic assumption of matter and force and confine themselves simply to the perceptual phenomena of interdependent motions, or such again as adopt the vortex-hypothesis or assume some kind or other of ether-condensation, etc., etc.

same laws may be analogically applied even to such molecular modes of motion as are due to those specific relations between the constituent elements of bodies that impart to them their distinguishing characteristics.

Under the mechanical aspect "evolution" can mean only what its name literally implies; namely, the necessary unfolding of what is already potentially pre-determined in the initial disposition of that which is being evolved. There is no room here for any accession of power, for any specific modes of energy, for any genuine epigenesis, for any creative play or spontaneity of action. Everything the absolutely fatalistic outcome of mechanically moved matter.

This mechanical view of things cancels inexorably the significance and efficiency we so fondly attribute to that inner life of ours which we find revealed as the most intimate manifestation of our being. Our thoughts, emotions, and volitions are then a mere useless, foreign by-play to the mechanical evolutions of insentient matter.

This is the sorry predicament in which mechanical science seeks to place our unitary being, this world-revealing self of ours, that constitutes in all reality the memorial and epitome of the ceaseless travail of time-evolved creation. To find a scientifically consistent way out of the entanglements of such a monstrously inadequate interpretation of natural occurrences should constitute the foremost endeavor of philosophical contemplation.

Our foundation has evidently to be laid deeper than either what is usually called materialism, or what is called idealism. For materialism of the atomic and mechanical kind fails to establish any legitimate interaction between bodily activities and the corresponding mental states. And it moreover fails to leave a way open for the endowment of sense-affecting existents with intrinsic properties and forces, such as give rise to the specific qualities and spontaneous activities we perceive. Idealism of the genuine kind, on the other hand, is erected on an essentially erroneous pre-supposition, on the postulate, namely, that mind as such can affect mind, or rather that the mental states of one being can enter into direct intercommunication with the mental states of another being. And it further fails

to afford any sort of explanation for the sense-derived percepts by which that other being is consciously realised; realised thereby solely as a bodily and not as a mental or ideal existent.

In the course of this discussion it has been shown that the perceptual realisation of matter in motion does only symbolically and remotely disclose the nature of that which is seen to move, hiding from view the veritable source of the activity thus perceived as motion. There has been found ample reason to conclude that the activity displayed by living beings, and symbolically perceived as their bodily movements, is a functional activity emanating from the non-mental nature of those beings; from that nature of theirs namely, which has power to arouse representative percepts in beholders. And ample reason has further been found to justify the conclusion, that the molecular motion visible during such activity in the mental image or perceptual realisation is of a nature altogether transcending any possible kind of mechanical motion.

Analogically we may rightly conclude, that all existents that have power to awaken representative percepts in beholders, and this means all perceptible things of this world, are likewise potentially endowed with specific modes of activity, of which the phenomena of elasticity, cohesion, chemical selection and union, and so on, are manifest displays.

Nay, the very power of arousing definite percepts in beholders is itself the most striking proof of specific, never-flagging activity on the part of the perceived existents; an activity which constitutes their very nature, and on account of which these sense-stimulating existents may well be called specific power-complexes.

The incalculable factor of newly arising modes of specific activity, which gives to "evolution" its true significance, is evidently introduced into nature by a more or less incidentally occurring combination of material elements. These combinations acquire thereby as newly formed compounds also newly arising specific properties of their own. And this means that they react in new and specific ways on being influenced or acted upon by surrounding existents.

Reaction by dint of specific, indwelling efficiency plays, as already stated, a far more important part in nature, than causation

understood as an external producer of effects. Material compounds, as they become more and more highly elaborated, oppose more and more specific modes of reaction to outside influences. And when in the living substance specific modes of reaction have become functionally attuned to specific modes of stimulation, then that significant play of interaction between organism and environment supervenes, which gives us rightly the impression of being purposive or teleological.

Considering what ceaseless vital toil, what slowly moulding interaction with a specific environment, carried on unremittingly during untold ages, was actually required to elaborate higher forms of conscious beings; how can we well conceive the consciousness of these beings, thus gradually evolved, and obviously only the outcome of functional activity; how can we feel justified in conceiving it as a separate and finally independent entity?

The activity of our being which gives rise to the emergence of an idea, say the idea of some definite movement to be executed, would in an outside observer awaken the perception of an infinitesimal molecular stir originated in some minute cerebral structure. And this molecular stir would be seen by the observer to spread along definite nerve-tracts until it reached the motor organs innervated by them. Here a voluminous molecular agitation would be incited, accompanied by contraction of the entire muscular substance. This motor function would by the outside observer be perceived as purposive movement, while it was being felt by the performer himself as voluntary activity.

The same activity incited, not by the performer's own initiative, but by some external influence, would not be felt as voluntary, but merely realised as automatic. This kind of automatism would be, however, by no means of a mechanical, but strictly of an organic, nature. It would be produced by intrinsic and specific modes of activity.

The difference between voluntary and automatic activity of the organic kind can be distinctly realised by watching, for example, our breathing movements. These are generally carried on automatically and unconsciously. By directing our attention to them

we, however, become conscious of the automatic activity. This is a genuine instance of conscious automatism; for there is no effective intercommunication between the movements and the awareness of them. The activity that underlies the conscious state, and the activity that underlies the perceived movements, are only concomitant and not interdependent. But we are, moreover, able to assume voluntary control of the movements. We can, at will, breathe quicker or slower, deeper or less deep, or entirely inhibit the movements for a time. The consciousness of this voluntary performance compared with the consciousness of the mere automatic action will clearly indicate the difference between spontaneous and automatic activity. Here the two activities have entered into effective intercommunication. The activity that underlies the movements has become dependent on the activity that underlies the conscious volition.

The complete volitional control we have over the movements of those muscular apparatuses that minister to our life of outside relations constitutes in the executive department of our being that freedom of activity, which enables us to transform the given opportunities of nature in compliance with our ideal purposes.

We may, then, finally and legitimately conjecture, that an existent, which under functional excitation becomes conscious, though it cannot itself be of the nature of any of its conscious states, must nevertheless as their all-containing potential matrix be considered as mentally endowed; must, in fact, be the bearer of the organ of mental awareness. And we may further legitimately conjecture that, what by means of inadequate symbolical representation is revealed to perception as our bodily organisation, is in all reality the existent that under functional excitation of its central organs becomes conscious.

The activity felt by us as voluntary is in verity the outcome of a spontaneous exertion on the part of our symbolically revealed, but otherwise hidden being. We hold spontaneous sway over the movements of the organs that minister to our life of outside relations. We control the use of our limbs, moving at will and manipulating with purpose the existents of the outside world. We voluntarily

incite or inhibit the movements of our sensory organs, thereby foreseeing the revelations or attesting the validity of our tactile impressions. And we intentionally innervate the movements of our vocal organs, communicating thus to our fellow-beings the experience these same articulated movements have enabled us to rationalise.

It is by force of such motive control that we are free and not automatic agents.*

EDMUND MONTGOMERY.

* After having for years in my deficient way urged the task of scientifically overcoming the mechanical or necessitarian theory, in order to arrive at a monistic conception of our own nature and the world at large, it is highly gratifying to find that so eminent a scientific thinker as Professor Peirce has, on entirely different and far more precise grounds, reached the same all-important conclusion.

THE NERVOUS CENTRE OF FLIGHT IN COLEOPTERA.

IS IT possible to know the physiology of an organ, that is to say, its functions, signification, and purpose, from a simple study of its anatomy? Eminent authors have said no to this question. Claude Bernard, the greatest physiologist of the century, especially, has contemned the assistance of anatomy in the understanding of the phenomena of life, and his ideas are generally accepted, having passed as authoritative into the standard works on the subject. To a great extent, this position is the correct one. It is incontestable that the majority of physiological discoveries have been made by physiology. I propose, however, to show that this rule admits of exceptions, and that we can, in certain circumstances, where it is impossible to resort to vivisection, apply the method of comparative anatomy to the solution of very nice problems of nervous physiology.

The philosophical interest of this method will make ample recompense for the dryness of details which the study of the nervous centre of flight in *Coleoptera* presents; for this is the investigation of which we are now about to give a sketch. We announced some time ago our intention to do this, in an article published in Vol. III, No. 1, of *The Monist*, where we sought to sketch the outlines of the normal structure of the ganglion.

It will be well, perhaps, briefly to recall at the outset the general disposition of the wings and the nervous system of *Coleoptera*. We know that these insects possess two pairs of wings, which are inserted in the dorsal face of the thorax. The posterior pair alone

serve for flight. They are composed of a fine, transparent membrane, supported by delicate nervures. The anterior wings, which are called "elytra," are sheaths of greater or less powers of resistance, sometimes speckled with bright colors, covering the wings when at rest and protecting them after the manner of a buckler. When the animal takes to flight the elytra spread, so as to permit the membranous wings to unfold.

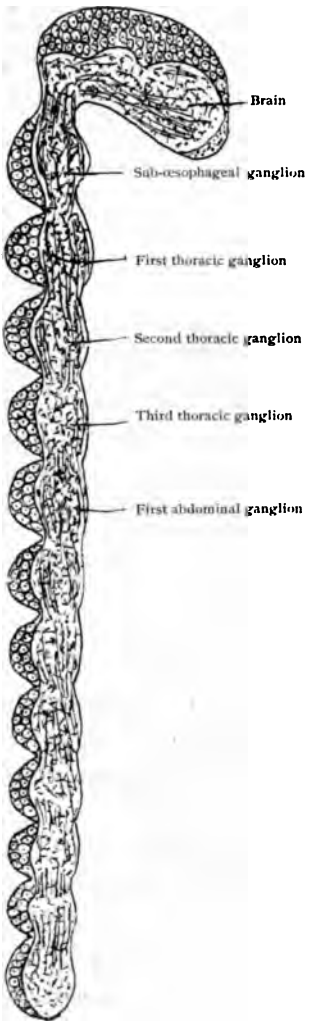

Fig. 1.—Schematic longitudinal section of the nervous system of a larva of a dipteron.

Each of these two organs is joined by a rather large nerve with the nervous system of the insect. This nervous system, which is of a quite complex character, is composed of a brain situated in the head, whence a nervous ring, encompassing the digestive tract, proceeds. This nerve-ring connects the brain with a chain of nerves that extends beneath the digestive tract the entire length of the ventral face of the insect and widens into a series of ganglia. This chain of nerves forms what is called the sub-intestinal nervous system. We may obtain some sort of an idea of this system of organs by casting a glance at Fig. 1, which represents the nervous system of the larva of a dipteran.

The first ganglion of the sub-intestinal chain is called the sub-œsophagean; it innervates the buccal parts and is usually located in the head of the animal. The second, third, and fourth ganglia, in the adult insect, are usually situated in the thorax; they are called the thoracic ganglia. These ganglia send out the nerves to the three pairs of

feet; they are consequently the locomotor ganglia. Next comes the abdominal chain of ganglia, which furnishes nerves to the cells of the abdomen and to the genital regions.

At present, the thoracic ganglia chiefly interest us, as these furnish the nerves of the wings and elytra. These ganglia are three in number. The first is not connected with the apparatus of flight, and, consequently, does not interest us; the second supplies the nerves of the elytra; and the third, the nerves of the wings.

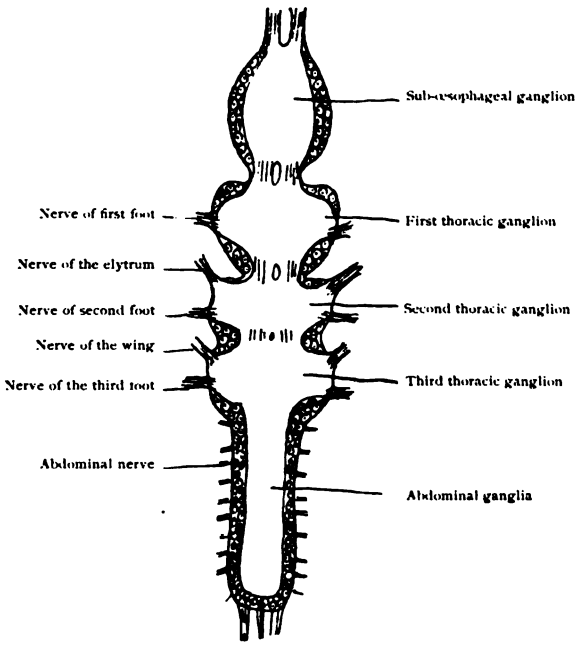

Fig. 2.—Schematic horizontal section of the sub-intestinal nervous system of *Rhizotrogus*.

The appended cut, which represents a horizontal section of the sub-intestinal nervous system of a coleopter (*Rhizotrogus*), shows the series of ganglia which we have just described, with the nerves that proceed from it. It will be noted that the second and third thoracic ganglia give out, respectively, the nerves of the elytra and of the wings.

This is a synopsis of the knowledge which the dissection of an insect with the scalpel furnishes us; to obtain any knowledge of

the internal structure of a ganglion, we are obliged to resort to the method of sections, which consists in cutting up an organ in slices sufficiently thin to allow of their being studied in a transparent form under the microscope. In any *section* of a ganglion, taken in any plane, it will be seen by such an examination that the small mass of nervous substance constituting the ganglion is always composed of the two following parts: a central part, of considerable size, composing three-fourths of the ganglion and made up of fibrillar sub-

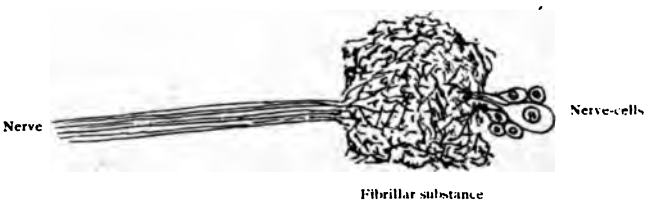

Fig. 3.

stance; and about it a second part, formed of nerve-cells, the number and size of which vary with the place. These cells give out prolongations, which lose themselves in the fibrillar substance. It is a conclusion to which precise researches directly point, that the

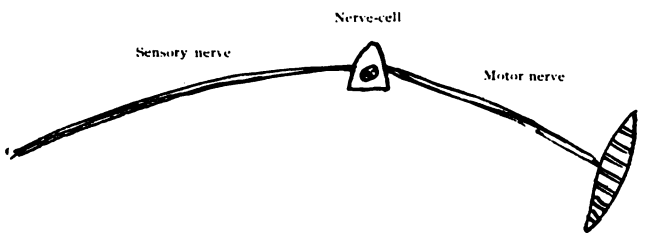

Fig. 4.

nerves which lead to a ganglion do not end directly in the cells, but in the fibrillar substance; and similarly the axial prolongations of the cells do not directly continue into the nerves, but are also lost in the fibrillar substance. This is schematically represented in Fig. 3. It will be at once seen that this histological arrangement greatly differs from the plan of the reflex arc (Fig. 4), which is now everywhere described, but is probably very inexact. According to the plan usually given, the sensory nerve ends directly in the nervous cell, which reflects the excitation to the motor nerve. The

nervous excitation follows a path presenting no solution of continuity. But, as a fact, in insects there is a something interposed between the nerve and the nervous cellule, and this something is the fibrillar substance, which is made up of a skein of fibres so complicated in structure, that it is hopeless to attempt to disentangle it. Consequently, we are in total ignorance as to whether a continuity exists between the nerve and the cell, or whether the excitation is not otherwise propagated between the two points.

Leaving aside this important question of nervous histology which is now occupying the attention of a host of observers, let us follow the alary nerve into the interior of the ganglion and see how it acts towards the organs which the ganglion contains. We shall now be obliged, in the interest of clearness, to say a few words concerning the internal organisation of a thoracic ganglion, but we shall

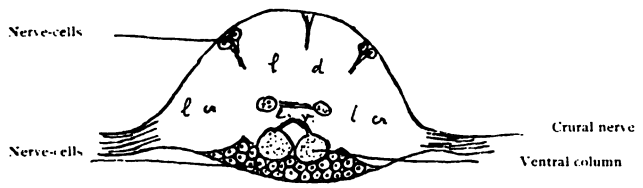

Fig. 5.—Schematic transverse section of a thoracic ganglion of an Insect.

restrict ourselves in this to what is absolutely necessary to an understanding of the plan of the alary nerve, and shall accordingly reproduce, very briefly, the substance of our preceding article. A thoracic ganglion may be regarded as made up of the following three distinct parts (in this description we shall only occupy ourselves with the fibrillar substance): a ventral lobe, a dorsal lobe, and, laterally, of two crural lobes. The crural lobes are connected with the nerves of the feet; these we shall not discuss. A difference of the dorsal and ventral lobes is seen at once by a glance at their fibrillar substances. This substance is quite tenuous in the dorsal lobe; while in the ventral lobe it is very dense, clearly outlining a special organ to which we have given the name of *ventral column*. In Fig. 5, which is a transverse section, we see, at the sides, the two crural lobes (marked *l. cr.*), in which the nerves of the feet end; higher up the dorsal lobe; and, beneath, the ventral lobe, which displays a cir-

cular section of the two ventral columns. And in the longitudinal section (Fig. 6), that is to say, in a section parallel to the flanks of the animal, the ventral column appears in its characteristic form of a column elongated along the ventral region of the ganglion; and above it in the dorsal lobe will be seen the connective filaments which traverse the ganglion longitudinally, and extend throughout the whole subintestinal nervous chain. Finally, a horizontal sec-

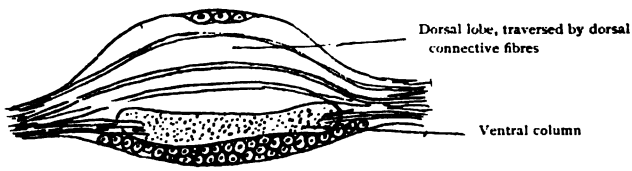

Fig. 6.—Schematic longitudinal section of a thoracic ganglion of an Insect.

tion, made parallel to the ventral face of the insect, shows that the ventral column is double and symmetrical. There exist, in fact, two ventral columns, situated one on each side of the median line;

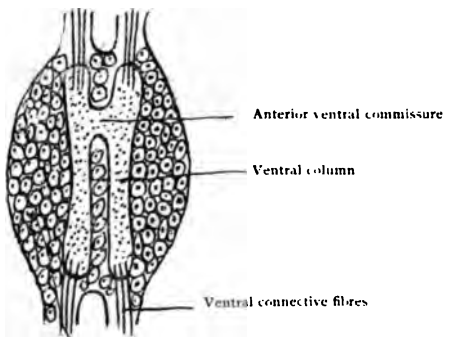

Fig. 7.—Schematic horizontal section of a thoracic ganglion of an Insect, showing the two ventral columns.

and this duality is evidently in some way connected with the primitive duality of the ganglion, which is developed in two distinct parts (Fig. 7).

The path of the alary nerve into the interior of the ganglion is sufficiently defined by these details. This nerve, considered for example in the cockchafer, penetrates the lateral regions of the upper face of the ganglion; then, after having passed the conjunctive envelope of the ganglion, it emits its extremely slender first root

which enters the upper parts of the dorsal lobe where it is accompanied throughout its entire course by a great number of tracheæ, amid which it is scarcely discernible; this is the *upper dorsal root* of the alary nerve. Then the trunk of the nerve continues its oblique course and descends; it traverses the bed of nerve-cells which surrounds in this region the fibrillar substance, and penetrates that substance. At this point it is subdivided into two roots, both much larger than that which we above described. The first of these roots

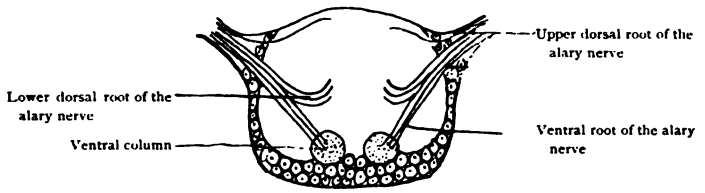

Fig. 8.—Schematic transverse section of a thoracic ganglion of a coleopter, showing the three roots of the alary nerve.

describes the small arc of a circle curved concavely upwards and rises again towards the dorsal lobe of the ganglion. This is the *lower dorsal root* of the alary nerve. The other makes directly towards the ventral column, which is its ultimate destination. This

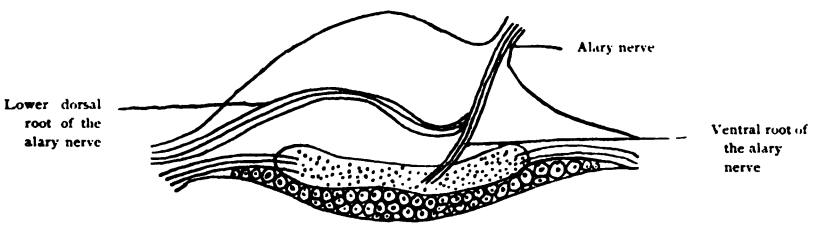

Fig. 9.—Schematic longitudinal section of a thoracic ganglion of a coleopter showing two roots of the alary nerve.

is the *ventral root* of the alary nerve. The disposition of these three roots is distinctly seen in a suitably taken transverse section like that of Fig. 8.

In some types of *Coleoptera*, for example, in the horn-beetle, it has been found that the ventral root is double. To determine the course of the lower dorsal root, which we have good reasons—to be mentioned later—for regarding as the characteristic root of the alary nerve, we must follow its path in an appropriate longitudinal section, i. e., in one which is slightly oblique (Fig. 9). In such a sec-

tion we find that this root crosses the ganglion from the front to the rear and enters the succeeding ganglion, which is the third thoracic ganglion. Here, all knowledge which microscopic anatomy furnishes us concerning the roots of the alary nerve ceases. Can we go any further, can we learn anything concerning the function of these roots ?

We already possess some interesting facts concerning the physiology of the thoracic ganglia of insects. These facts are due to the fine and precise researches of Faivre, a naturalist as eminent as he is modest, who has, perhaps, not yet acquired the full reputation which is his due. Faivre has long studied, with a sort of predilection, the genus *Dytiscus*—the coleopter of marshes and swamps, the water-beetle, which owing to the facility with which it may be procured at all seasons, and also owing to its large size, seems almost predestined for vivisection, and may be almost regarded as the frog of the invertebrates. Faivre has minutely studied the properties of all the nervous ganglia, of the connective filaments, of the nerves, and even of the stomato-gastric system of this animal. He is ignorant of the internal structure of the parts on which he experimented. The method of sections was not practised at that period. He simply connected the effect of the irritations, punctures, and experimental lesions which he made with the exact point that had been injured. He has traced, thus, a *topographical physiology*, the precision of which in my judgment is admirable, as every time that I have repeated his experiments I have arrived at exactly the same results. We shall not speak here of his researches on the stomato-gastric system, nor of those on the brain, in which he defined the boundaries of the motor centre of the antennæ at a time when men were still ignorant of the existence of the deuto-cerebrum. We shall simply restrict ourselves to a recapitulation of the results obtained by him in his experiments on the thoracic ganglia.

Guided doubtless by the idea of an analogy between the functions of the sub-intestinal nerve-ganglia of insects and the functions of the spinal marrow of vertebrates, Faivre sought to discover whether the outermost peripheral face of the ganglion of an insect was not endowed with especially sensitive properties, and the face

farthest inwards with especially motory properties. We need scarcely recall to the reader's attention the well-known fact that in insects, viewed in the natural position of locomotion, the nervous system of the thorax and the abdomen is sub-intestinal, while in vertebrates the nervous system is situated wholly above the digestive tract, and that, consequently, the face of this system which is nearest the periphery of the body is ventral in insects and dorsal in vertebrates; in other words, the development of the nervous system which is effected in parallel lines in the two types of animals at the expense of the ectodermal layer, takes place for the sub-intestinal ganglia of insects in the ectoderm of the ventral regions, and for the vertebrates in the ectoderm of the dorsal region. The result of this disposition is, that the ventral face of the ganglion of an insect is the homologue of the dorsal face of the spinal marrow; and Faivre has effectively shown that these two faces are possessed of the same sensitive properties.

The experiments of Faivre bear especially on the movements of the feet, which are quite easy to observe, and which are much more varied than the movements of the wings or the elytra. The experimenter first established that the sensibility of a foot and its powers of motion can be destroyed separately. Lesions or simple irritations may be made, so localised that the same foot when excited directly will remain at rest, but when the irritation is made elsewhere, on another foot, or on an antenna, or on the pegidium, will move with vivacity. The interpretation of this case is that the foot, not responding to direct excitations, has lost its sensibility, but conserved its powers of motion. Conversely, the lesions may be so localised that a foot will remain absolutely motionless and inert in all cases, as well during direct excitations of itself or other feet as during spontaneous movements of the animal, yet the localisation be such that by irritating this foot a motor effect is produced in other parts of the body. In this case sensibility is preserved but the power of motion lost.

It is possible, thus, notwithstanding the opposite opinion of a number of modern physiologists, to destroy separately each of the two functions sensibility and motion, which are not so indissolubly connected as is generally supposed.

To produce these two inverse effects Faivre found, after many attempts, a precise place for the lesion. The best means appeared to him to be a slight pressure with a flat lancet on one of the faces of the ganglion. The compression of the dorsal face, or a very superficial puncture of that face, or the insertion of the blade under the perineurium produces simple motor paralysis without anæsthesia; the compression of the ventral face produces anæsthesia without loss of the power of motion. The last symptom, it seems, is more difficult to provoke, and it is necessary to take great pains in not overdoing the compression if we wish to obtain an anæsthesia wholly free from movement. Let us add that these phenomena of paralysis are frequently transitory and disappear in a few hours; but their duration is sufficient to admit of exact observations, which gain the conviction of the experimenter. We have continued the experiments of Faivre by a new method, which we shall not enter into here, and have found results which are absolutely exact.

We now propose to show that we can arrive at the same conclusion by comparative anatomy. To discover whether this organ is motory, and that sensory, we may dispense with physiological experiments and replace the scalpel by the microscope. Without making a lesion, which destroys the natural disposition of the organs, we can, by simply describing the microscopic section, read in that section the physiological significance of certain structures. This method of comparative anatomy goes much further, it seems to me, than that of Faivre. In the first place, it is more precise, as it replaces an experiment, that is to say, a transitory phenomenon, of which soon afterwards only the memory is left, by the observation of a permanent preparation. Further, the vivisections of Faivre referred only to a part or region and not to an organ. To establish that the ventral face of a ganglion is sensory is only an approximate result. What internal organs of a ganglion does this face comprise? Where does it stop? And as many more questions, to which no answer can be given by the scalpel. But comparative anatomy, as we shall see, is not content with pointing out the sensory region; it also determines the organ and the nerve.

Let us see, now, how this anatomical demonstration can be ef-

fected. We have directed our attention to certain coleopters which present the interesting characteristic of possessing wings and of not making use of these for flight or for any other movement. An appellation is wanting for these coleopters, and we have accordingly supplied them with one: Aptesids, from *a*, privative, and *ptêsis*, flight, to point out their chief deficiency, which is not the lack of an organ, but of a function. Our examination is restricted to three of these coleopters of quite different families, namely: *Blaps mortisaga*, *Timarcha tenebricosa*, and *Carabus auratus*.

In these three species the membranous wings are wanting. The elytra exist, but are immobile and generally soldered together at the median line. These organs conserve their office of affording protection for the abdomen. There is a curious instance of dissociation here between sensibility and motion; the elytrum has remained sensory, but has lost the power of motion.

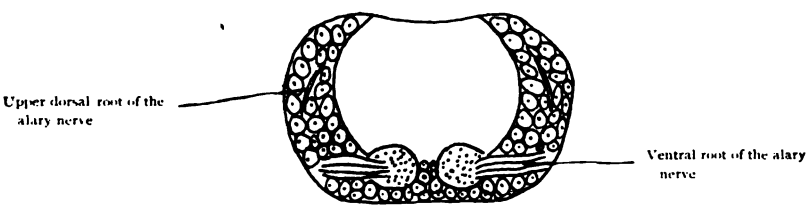

Fig. 10.- Schematic transverse section of the second thoracic ganglion of *Timarcha tenebricosa*.

It is natural, then, that we should seek the extent to which this physiological modification has affected the internal structures of the ganglion. The idea of such an investigation would never occur to us, if we did not know that insects of the same order are comparable one with another, and if our studies had not already informed us that a thoracic ganglion, for example, has much the same organisation in all coleopters. We can, then, legitimately suppose that the roots of the alary nerve present the same disposition in a coleopter that flies and in a coleopter that does not, and that the differences which may exist between the two cases should be attributed to the physiological modification referred to.

Let us now cast a glance at a transverse section, seen in Fig. 10, of the second thoracic ganglion of *Timarcha*. We see that the

roots of the alary nerve have suffered considerable reduction. The upper dorsal root subsists. The ventral root also subsists, with important diminutions, which we already know about. The suppression continues to the intermedial root and to the lower dorsal root, whose strange course we have described above.

We have not traced this root on the drawing, because we have not been able to find it in our preparations. Has it wholly disappeared? We shall not answer this question in the affirmative. It is sufficient to cast a glance at the tangled mass of fibres of one of these preparations,—which our drawings always simplify and schematise,—to understand how dangerous it would be to deny the existence of fibres which could escape the most practised eye. Still, a negative result should, with reservations, always be admissible. The only conclusion to be insisted upon is—and this conclusion is quite sufficient to serve as the basis of our physiological deductions—that if there exist in the ganglion of an aptesic coleopter fibres representing the lower dorsal root of the alary nerve, these fibres must be greatly reduced in number and in importance, for while a lower dorsal root is discovered with great facility in a ganglion which possesses the power of flight, here these fibres are not at all distinctly discernible. If, at some future day, by means of more perfect technical methods, we succeed in clearly distinguishing these fibres, it will yet always be exact to say that the loss of the power of flight in *Timarcha*, *Blaps*, and *Carabus* is especially indicated in the lower dorsal root, and that consequently this root should be considered as motory in character.

This is the main conclusion which we are now in possession of, and one which will serve us as a point of departure for a whole series of deductions. But, before accepting it, it will be best to seek the criticisms which can be advanced in connexion with it.

If the lower dorsal root is motory, the ventral root is sensory; these two conclusions are inseparably connected. We may ask, in this connexion, what can be the nature of the slender root which goes to the upper dorsal region of the ganglion, and which exists in *Timarcha*. It is too far removed from the ventral root to be endowed with sensory properties. Should it be considered motory?

This supposition appears to be contradicted by the fact that the elytrum is immobile and has no need of a motor nerve.

This slight difficulty of interpretation appears to us to find its solution in a remark which must be made concerning the constitution of the alary nerve. This nerve is not wholly composed of fibres which go to the wing ; branches proceed from the alary nerve, which distribute themselves in the walls of the body. The alary nerve is thus a nerve at once alary and parietal ; and it is probable, therefore, that the upper dorsal root belongs to the parietal fibres.

It now remains to be known how the alary nerve is represented in the third thoracic ganglion of the aptesic coleopter. The third thoracic ganglion supplies the nerves of the membranous wings. These latter, we have said, are wanting in *Timarcha*, as also in two other aptesic coleopters. Fig. 11 represents a transverse section of

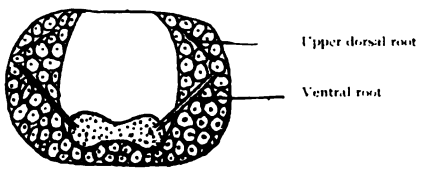

Fig. 11. Schematic transverse section of the third thoracic ganglion of *Timarcha tenebricosa*.

the third thoracic ganglion of *Timarcha*. It will be seen that the alary nerve is represented here by two roots, exactly as in the second ganglion ; only,—and the difference is one of great importance,—that while in the second thoracic ganglion the ventral root of the alary nerve is very voluminous, here, in the third ganglion, it is much attenuated.

Now, keeping this feature in mind, it appears that we may compare this nerve in its attenuated form to one of the parietal nerves which we found in the series of the abdominal ganglia. The abdominal nerves are apparently composed of two slender roots of which one extends into the upper parts of the dorsal lobe, while the other terminates in the dorsal column. The resemblance is indeed so perfect that Fig. 11 might represent indifferently a section of the anterior region of the third thoracic ganglion and a section of the abdominal ganglion.

This permits us to make, in passing, an instructive comparison between an abdominal (or parietal) nerve and the alary nerve. These two types of nerves have a common root, the upper dorsal root. They also have a quite analogous second root, the ventral root, which is thin in an abdominal nerve, but quite voluminous in an alary nerve. What characterises the latter, is the presence of the lower dorsal root, which is not represented at all in an abdominal nerve. We may say—neglecting slight differences—that the alary nerve is an abdominal or parietal nerve, to which a lower dorsal root is added.

This resemblance seems to us confirmed in a very distinct manner by an observation which we have made on the thoracic ganglia of the larvæ of *Coleoptera*. We were curious to know in what form an alary nerve appeared in the larvæ, which, as is well known, possess no wings. Fig. 11 could also represent, just as faithfully, a section of a larval thoracic ganglion taken at the level of the anterior region; that is to say, the alary nerve is represented in the larvæ by a parietal nerve. Again, embryogeny supplies a further confirmation of these deductions, by showing us that the wing is not, like the leg, a real appendage, but is produced from the wall of the zoonite, which at the points where this development does not take place is innervated by a parietal nerve. But let us leave these incidental considerations and return to our main subject.

We may consider it for the present an established fact that the alary nerve has a sensory root, namely, the ventral root, and a motor root, namely, the lower dorsal root. This conclusion, we see, is in perfect accord with the experiments of Faivre, who has established that the ventral face of the ganglion is endowed with sensitive properties, and the opposite face with motor properties. Our conclusion goes much further, for instead of referring us to a province that is undefined, it points out to us with absolute precision a tangible bundle of nerve-fibres.

Knowing the nature of these fibres, we can, by examining the lobes in which they terminate, learn by inference the physiological properties of the lobes. It is thus that the ventral column receiving the sensory fibres must be considered as an organ of sensation, while

the dorsal lobe which receives the motor fibres is certainly a centre of motion.

This is not all. Observation shows that the fibres that traverse the ventral column from the front to the rear do not fuse in the connective filaments with the fibres that traverse the dorsal lobe of the ganglion. The inference from this is that the dorsal region of the connective filaments is motory, and the ventral region sensory.

Continuing our deductions, if we examine the brain of the insect, we shall observe that it includes a region, the fibrillar substance of which has the same loose texture as the dorsal lobe of a sub-intestinal ganglion, and also a second region where the fibrillar substance is as dense as in the ventral column. Owing to the cephalic curvature, these regions present a substantially different disposition, and the ventral region of the sub-intestinal ganglion is represented in the brain by the anterior region; similarly, the dorsal region of the sub-intestinal ganglion becomes the posterior region in the case of the brain. These homologues, vague as they at first may appear, possess at least the interest of showing that in the most complex ganglia of the nervous system of insects, in those ganglia that are incontestably the seat of high psychical functions, we find the same divisions of sensory and motory centres.

We shall close by remarking that there exists in the brain of insects a very large body on which anatomists have bestowed the name of pedunculate body, but whose functions, despite some curious observations, have hitherto remained an enigma. It is regarded as incontestable that the pedunculate body is an organ of psychical functions, as it only exists in the first brain and is not in connection with the nerves of special senses; and also because, as the beautiful researches of M. Forel on ants have shown, the development of this body seems to be greater in proportion as the insect is more intelligent. Our studies of the alary nerve make an important addition to the ideas hitherto held on this subject. In view of the fact that the pedunculate body belongs almost entirely to that region of the brain which we may consider sensory and which is the homologue of the ventral column, we believe it can be maintained that the pedunculate body is a sensory organ. ALFRED BINET.

HEREDITY VERSUS EVOLUTION.*

AN INVESTIGATION.

WHEN Dr. Prosper Lucas published his work on "L'hérédité naturelle," in 1847, which was the first attempt to create the science of heredity, he established his theories on the metaphysical basis of two laws, one of spontaneity, by which nature tends freely to create and invent, and the other the law of heredity, by which nature tends subordinately to imitate and repeat her creations. He pursues this philosophical discussion through fifteen hundred pages, but his facts are so largely given on hearsay evidence that his book has little scientific value. He gravely cites the case of a Jew who could read the contents of a book through its covers without opening it, and says his son inherited this remarkable power. Yet Dr. Lucas's work no doubt gave the name to the study which has in the last few years become so important. Galton, in England, followed Lucas, but on a much higher level, in his "Hereditary Genius," 1865. Ribot, in France, made a considerable advance in his book on "Hérédité." Such works form a class by themselves. They constitute the necessary stage of theory and assumption through which the study has passed to its present more scientific period.

The word "heredity" had not been anglicised in Darwin's time, and consequently he discussed the subject, as did Galton,

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* This paper was read recently before the Anthropological Society of Yonkers, New York. For the purpose of exactness, the writer has made free use of his authorities, and the claim to originality, if any, rests on the grouping of the subject, the point of view from which it is considered, and the application of the principles advanced.

under the more correct word "inheritance." The transfer of the word to English is, it would appear, due to its use by Herbert Spencer, who either adopted it from some less known writer or took it direct from the French. In either case, he began its use without referring to the source to which he was indebted for it, or explaining critically its meaning.

Thus formally introduced as a scientific word, first, in the French by Lucas, and then in the English by Spencer, it gained an immediate and wide-spread acceptance, under the rule that it is legitimate to take a word out of its ordinary and familiar use and give it a special meaning in scientific discussions.

The definitions now given by various writers are in part as follows:

Weismann says: "The word heredity, in its common acceptation, means that property of an organism by which its peculiar nature is transmitted to its descendants." Again, "Heredity is the process which renders possible the persistence of organic beings throughout successive generations." Ribot defines its meaning as "that biological law by which all beings endowed with life tend to repeat themselves in their descendants. It is for the species, what personal identity is for the individual." Herbert Spencer, carefully following Ribot, defines it as "the law that each plant or animal produces others of a like kind with itself." Romanes says more accurately, "The great principle pervading organic nature, which is seen so mysteriously to bind the whole creation together, as in a nexus of organic affinity, is now understood as nothing more or less than the principle of heredity." Again, "We know that the characters of parents are transmitted to their progeny by means of heredity." He also speaks of "the large class of known facts and unknown causes which are conveniently summarised under the terms heredity and variability."

While these definitions show us its meaning, they also reveal how closely allied heredity is to evolution, and an examination of the definitions of the latter indicates that the two words are almost interchangeable. Evolution is defined by Romanes as the "theory of a continuous transmutation of species"; by another writer as "an

explanation how all existing species may have descended from one or a very few low forms of life," or how "existing forms of life have descended by true generation from preëxisting forms," or as Professor Huxley gives it, "the hypothesis which supposes the species living at any time to be the result of the gradual modification of preëxisting species." Evolution, in short, is a theory of descent. Heredity also has as its only topic "descent," and it inevitably leads us to a discussion of similar investigations, theories, and lines of thought. Though they treat of the same subjects, there are differences to be noted in the methods of treatment adopted.

Evolution may be said, in the words of Weismann, to be "a merely formal explanation of the origin of species, while heredity is an attempt to discover the real and genuine explanation." He adds that investigation "brings out clearly the speculative character of the whole hypothesis of evolution. Darwin only asked what was necessary to assume in order to explain this or that fact in heredity, without troubling himself to consider whether the assumption were borne out by facts or not." This is a fair deduction from the words of Darwin, where he writes, "the principle of natural selection may be looked upon as a mere hypothesis." Also, when he pointed out that his hypothesis of pangenesis was "merely provisional" and "an expression of immediate and by no means satisfactory knowledge of these phenomena." "Ideal theories," says Weismann, commenting on this frank acknowledgment, "are by no means useless. They are the first and often indispensable steps which we must take on our way to the understanding of complex phenomena."

Evolution is a theory, an hypothesis, an inspiration, and as with all the revelations which have come to mankind, the statement precedes the practical proof, which is taken up afterwards when the exhilaration, the divine afflatus, of the original conception has subsided. Then cold common sense takes the place of enthusiasm and the dissecting table, and the microscope the place of the pleasures of composition.

The comparison may be summed up in the antithesis that evolution is a theory of descent, and heredity the science of descent.

As we have found that the definitions and scope of evolution

and heredity are similar, so we may notice that the discussion of their fundamental propositions run parallel, and they both begin with the affirmation and denial of the same proposition. Evolution in its modern development is held to have taken its rise from the hypothesis of Lamarck, that the effects of use and disuse are inherited. Heredity may be said to have become a science when Weismann in his famous lecture denied that acquired characteristics are transmitted.

The transmission of the effects of use and disuse is the fundamental proposition of Lamarck. Existing forms of life, says Lamarck, have descended by true generation from pre-existing forms. Use and disuse produce development and atrophy of organs, and on this principle he based his theory of the transformation of species. Darwin also made prominent use of this theory, though he greatly amplified it by his hypothesis of natural selection. Spencer distinctly returned to it. He rested his whole system of biology, and in a conspicuous manner his "Data of Ethics," on the Lamarckian hypothesis of the transmission of the effects of use and disuse. His revival of this theory gave rise to the term Neo-Lamarckian. These hypotheses were only a development of the teachings of Lamarck and rested on his fundamental doctrine.

If the conclusion of Weismann be true, evolution is only the outgrowth of inherent and not added or acquired faculties, and the relation between one generation and another that of a trustee and not of a parent or creator.

If it can be proved that "the heredity tendencies" as claimed by Weismann "are transferred from generation to generation, at first unchanged and always uninfluenced in any corresponding manner by that which happens during the life of the individual which bears it, then all our ideas on the transformation of species require thorough modification, for the whole principle of evolution as proposed by Lamarck and accepted by Darwin, entirely collapses." Professor Osborne, of Princeton, has said, "if from the evident necessity of a working theory of heredity the *onus probandi* falls upon the Lamarckian—if it be demonstrated that the transmission of acquired characteristics does not take place, then we are driven to the

necessity of postulating some as yet unknown factor in evolution to explain the purposive or directive laws in variation." Weismann prefaces his "Lecture on Heredity" with the explanation that in it he "treats only of the transmission of acquired characteristics which has hitherto been assumed to occur," and adds that "the inheritance of acquired characters has never been proved either by means of direct observation or experiment." Pflüger also, in reference to the arguments in favor of Lamarck's theory, says, "Not one of these facts can be accepted as proof of the transmission of acquired characters."

These are broad statements, for Spencer had adduced these facts, in support of transmission: the diminished biting-muscles of lap dogs, diminution of jaws, crowded teeth, blind cave-crabs, the neck of the giraffe, the development of the æsthetic faculties, inherited epilepsy in guinea-pigs; and Darwin had rested his argument on a learned mass of scientific facts, such as the reduced wings of birds of Oceanic Islands, drooping ears and deteriorated instincts, wings and legs of ducks and fowls, pigeon wings, shortened breast bone in pigeons, shortened legs of rabbits, blind cave-animals, inherited habits, tameness of rabbits, short-sight in watchmakers and engravers, larger hands in laborers' infants, and inherited mutilations.

All these questions are discussed and ably treated by William Platt Ball, in his book "Are the Effects of Use and Disuse Inherited?"—in which he takes the negative. He finds in natural selection and panmixia a sufficient explanation of these phenomena. In reference to the giraffe, he quotes Darwin as saying, natural selection alone "would have sufficed for the production of this remarkable quadruped."

It was a great work for any man to undertake single-handed to reverse the received opinions of the scientific world on so fundamental a proposition as the transmission of acquired characteristics, and yet the opinion is now gaining general acceptance that this work Weismann accomplished, so that now the position he announced first in his "Essay on Heredity," which appeared June 21, 1883, has been received and accepted by the leaders of the evolutionary school. A. R. Wallace, who shares with Darwin the dis-

tinction of the first promulgation of evolution and natural selection, expresses his acceptance of Weismann's dogma of the non-inheritance of acquired characteristics in these words. "We cannot therefore accept any arguments against the agency of natural selection which are based upon the opposite and equally unproved theory that acquired characteristics are inherited, and as this applies to the whole school of Neo-Lamarckians, their speculations cease to have any weight." Prof. Ray Lankester writes, "It has never yet been shown experimentally that anything acquired by one generation is transmitted to the next."

Mutilations have been inflicted upon men and animals for centuries, such as flattening the head, boring the ear, tattooing the flesh, mutilations for ornament and as religious ceremonies, and yet not the slightest effect is thereby produced upon new generations of men and animals. The feet of Chinese women are normal, the bandaging for generations has not produced the slightest diminution in their size. Experiments have been made upon mice extending over a thousand specimens by cutting off their tails, without changing the form of that member in succeeding individuals. No child was ever born who knew how to read or talk or play on the piano. The instances which are narrated of the transmission of acquired characteristics are found upon examination to be idle tales, chiefly provocative of mirth, as when Weismann remarked on being told of the transmission of the marks of a broken leg, that it was strange the scar did not arrange itself in the form of an inscription "to the memory of the fractured leg of my dear mother."

To understand the scope of the dogma of Weismann we must distinguish clearly what is meant by an "acquired characteristic." Some diseases are transmitted, for instance, tuberculosis and smallpox; but a microbe which is supposed to be the foundation of these and other hereditary diseases, is not an acquired character. It is simply a parasite. Weismann defines an acquired characteristic as "a local and sometimes a general variation which arises under the stimulus of external influences." He gives the name of "somatogenic" to the characters which take their rise in the "soma" or

body, and "blastogenic" to characters which belong to the germ or type.

The doctrine is that no changes of the characteristics relating to the body and no mental acquirements which are not inherent in the type of the parent can be transmitted. As Burns sang—"A man 's a man for a' that," and the disadvantages as well as the advantages of surroundings, the polish, refinements, and acquirements of wealth and education, as well as the rudeness and ignorance of poverty are not transmitted. This doctrine only can explain the facts of life. From the common people and from the aristocracy alike, spring leaders of thought and men of action. There is no warning or intimation given of the advent of genius, and where we look for it, it is not found. The question then arises, what is the cause of the preservation of the type unchanged not only from generation to generation, but from one geological period to another? Why do offspring resemble their parents in not only general, but particular features? To account for these phenomena, the various theories have arisen regarding the germ as the sole bearer of life.

Weisner remarks that theories of heredity have always adopted units invented for that purpose, so that the composition of living matter out of very small units has become one of the fundamental points of such a theory.

That the world and all that it contains is composed of minute particles is a theory as old as Democritus who first propounded the atomic theory four hundred years before Christ. The discussion which began in his time against his theory and in favor of that of Anaxagoras who believed in the continuity of bodies and that all matter which had extension was likewise susceptible of division, has continued even down to modern times. Descartes denied the atomic theory. Leibnitz, on the other hand, regarded his monad as the ultimate element of everything.

When the microscope became developed into a serviceable instrument, in the middle of the seventeenth century, the Dutch philosopher Leeuwenhoek first discovered the corpuscles in the blood. But the imperfections of microscopes caused their use to be almost entirely neglected, until in 1832, when owing to the great improve-

ments in their construction, minute structural anatomy has been if not created anew, at least thoroughly revised. John Goodsir laid great stress on the office of the nucleus in the growth and reproduction of cells. Virchow still further developed the idea of the cellular structure of the animal organism. Hugo Van Mohl, and after him, Max Schultze designated the contents of the cells of vegetable and animal organism as protoplasm.

Ernst Brucke (1861) was the first to maintain the existence of small vital particles. He did not give them a name, but he opposed the old theory of cells and showed that their bodies must possess organisations quite distinct from the molecular structures of organic compounds.

Herbert Spencer considered that the whole organism is composed of what he called "physiological units," in all of which he says there dwells the intrinsic aptitude to aggregate into the form of that species.

Darwin followed with the theory that each cell of a living body possesses the power of giving off invisible gemmules or atoms, and these "gemmules are conveyed into the blood and thus circulate through the body."

Galton then wrote denying the circulation of the gemmules and substantiating his denial by satisfactory proof.

Elsberg introduces (1874) the term "plastidule" to designate the hypothetical ultimate particles of which protoplasm is composed.

Weismann began in 1883 to introduce his idea of germ-plasm, maintaining that the body which nourishes the germ-cells is only an outgrowth of one of them.

Nageli in 1884 attempted a mechanico-physiological explanation of the theory of descent. He calls his ultimate particle a "micella," which he defines as a minute crystal, microscopically invisible. In 1889 a writer named De Vries developed a theory of heredity in a paper on "Intracellular pangenesis," in which he substituted for Darwin's gemmules the ultimate vital particles which he called "pangenes" which are the bearers of the constituent qualities of the species.

But it is left to Weismann to develop a theory of germ-plasm

and continuity of life which carries the minuteness of organisms to a point beyond which it would seem impossible to go. Weismann is a microscopist, and he shows his reliance upon the microscope in the study of questions of heredity when he says, "I have not been able to make out by my own observations the correctness of these views as to the ancestral units, my impaired eyesight, which has so often put a stop to microscopical investigations, has again rendered the continuation of these researches impossible."

The most important of Weismann's doctrines, the non-transmission of acquired faculties, we have already alluded to; we now approach a second, the continuity of life. His researches in connection with these two discoveries elevate him to the highest rank among biologists, and a word may not be out of place regarding his style. He is a most satisfactory writer, for he never hesitates to express his belief as it is at the time of writing. The scientific caution of Darwin is entirely lacking in him. His constant and emphatic use of the words, "I believe," is a rebuke to the wishy-washy indifferentism which agnosticism has made popular, and sets a fine example of sincerity and independence to all who discuss scientific subjects. He is not writing for effect or to establish a theory, but to discover the truth. He has no weak pride of self-consistency, and chronicles his change of belief with unaffected simplicity and freedom. He abounds in trenchant epigrammatic statements, which carry conviction of their sincerity, if not always as to their truth.

In a word, his theory of germ-plasm is three-fold. By a long process of reasoning and investigation, he arrives at the conclusion that there is, first, a comprehensive physiological unit, which represents the ideal of the individual, whether a plant or animal. This he calls the "id," the first syllable of ideoplasm. It is the architectural thought of the individual. There is, second, the determinant, a unit which controls the method and direction of the development of the individual, which might be called the will if metaphysics had not gone out of fashion. Each "id" in the germ-plasm is built up of thousands or hundreds of thousands of determinants. Lastly, there is the biophor, the life-bearer, the smallest and most multitudinous of all the units. The number of possible kinds of biophors

is unlimited. These three units, somewhat similar in characteristics to body, soul, and spirit, constitute the historic, architectural, ancestral germ-plasm, or model from which the individual is formed. By means of a microscope the eye can see one of four thousand lines in four-tenths of an inch; but in size these biophors are inconceivably beyond the power of the microscope. In a human blood corpuscle squared there might be 703,000,000 biophors. Professor Mivart says, "I confess I do not believe such a collocation is possible." But these multitudinous aggregations allow the supposition towards which Darwin, Spencer, Weismann, and others have inclined that there are just as many independent and variable parts in the germ-plasm as exist in the fully formed organism. Under the power of the determinant, a single biophor might be developed into the skin of half the face, for instance, and as there are thousands of millions of biophors in each individual, the combinations of developed characteristics become infinite, and it is practically impossible for any two individuals to be alike. The circumstances, forces, conditions, accidents, as we call them, of life, or, as some say, the environment, compel development or restrain it, and produce an endless variety. But this variety is one limited by historic and inherent blastogenic characters. The multitude of biophors seems required not only by the individual, but by his descent. The characteristics of the immediate parents, as developed in the offspring, are inconceivably numerous; but if, as we believe, there has been an upward development from lower to higher orders, the characteristics possessed by a long ancestry of all these forms of life must be represented. An explanation of reversion and atavism is thus offered. Sickness, health, accidents, favorable or unfavorable surroundings will control the development of the biophors, and thousands of millions will never be called into activity, while those which are developed will determine the character of the personality which will result.

Thus the biophors representative of near or remote ancestors may be developed in any individual. Camoens, the epic poet of Portugal of the sixteenth century, not only fascinated his countrymen with the charm of his poetry, but also by his dazzling beauty

as a pure blonde, descended from and surrounded by a swarthy race. A single biophor might have floated down to him from some unrecorded ancestor, or even more remotely still from some yellow-haired animal, and, by an occult cause, have been so developed in him as to control his whole personality.

Shakespeare expresses and exhausts the thought when he puts into the mouth of a slave of Cressid this description of Ajax:

"This man, lady, hath robbed many beasts of their particular additions;* he is as valiant as the lion, churlish as the bear, slow as the elephant; a man into whom nature hath so crowded humors that his valor is crushed into folly, his folly sauced with discretion. There is no man hath a virtue that he hath not a glimpse of, nor any man an attaint, but he carries some stain of it."

This is the whole science of heredity anticipated by two hundred and fifty years.

But this variety is limited by historic and inherent blastogenic characters, and consequently development takes place within a prescribed range. Outside of this range is infertility. Each species is therefore sharply circumscribed on all sides by the doctrine of non-transmission and the continuity of life. Yet the evolutionist assumes to account not only for one species, but for all, and for all the changes by which the unicellular organism is differentiated into the multicellular.

Evolutionists of the extreme Neo-Lamarckian school, of whom Herbert Spencer is an example, if not the leader, account even for the existence of well developed moral sentiment and the feeling of obligation, the oughtness, by the Lamarckian principle. In his letter to John Stuart Mill, Spencer writes: "Moral intuitions are the results of the accumulated experiences of utility." He speaks in his "Data of Ethics" of "the inheritance of the effects of the pleasurable and painful experience in progenitors," which is the basis on which his whole psychological view rests. If there is no transmission, then, as Wallace said, "his speculations on the subject cease to have any weight," and the source of the feeling of oughtness can-

* Shakespeare here and elsewhere uses the word "additions" in the sense of characteristics.

not be utilitarian, empirical, and evolutionary, but must be inherent, intuitional, and blastogenic. The existence of native moral sentiments is confirmed by the earliest known writers, by the tenderness of Buddha towards human suffering, by the provision of the Jewish law, "thou shalt not seethe the kid in its mother's milk," by the writings of Catullus in Rome's most cruel era, and in modern times by the aptitude of savages to become civilised.

Let us ask, what effect has the theory of the continuity of the germ-plasm on the other theories we have been considering. Evidently it corroborates and confirms the non-transmission of acquired characteristics, for it proves that the germ is ancestral and historic, and it builds up an individual well furnished with capacity for development, as we used to say, or with biophors, which may be called into activity or lie dormant as the determinants may elect or circumstances require. Incidentally it excludes stirpiculture, and it shows the necessity of the education and amelioration of every successive generation and of every member of each generation, as the only means of race improvement. It shows that the parent is a trustee and not a creator, in which it follows the teaching of the highest scientific authorities. And finally, it shows that if evolution is to stand, some new principle must be adduced in its support, as was said by Professor Osborne; for the trend of non-transmission and continuity only teaches that all things must have continued from the beginning of their creation as they are.

There are two rival hypotheses to account for the differentiation we see in the organic world. Evolution, in the various forms in which it is held, and special creation in its varying shades of acceptance. The evolution of Lamarck and Spencer need not be referred to as that has already been sufficiently considered.

Evolution by natural selection is the solution advanced by Darwin and his school to account for variation, the origin of species, and the upward progress visible in the organic world: while the vast conservative majority, which learns slowly and moves cautiously, replies, on the authority of the consentient opinion of mankind, it is rather development by special creation.

Let us, then, get an understanding of these two theories from

definitions given by those who are authorised to speak. Weismann says: "Charles Darwin and Alfred Russell Wallace have taught us to understand by natural selection that process of elimination effected by nature itself, without the aid of man." Darwin himself says: "The term natural selection is in some respects a bad one, as it seems to imply conscious choice." Again: "For brevity, I sometimes speak of natural selection as an intelligent power. I have also often personified this power, for I have found it difficult to avoid this ambiguity." Again: "The principle of natural selection may be looked upon as a mere hypothesis." These definitions were enunciated when natural selection was first advanced to complete the theory of evolution. Professor Romanes, of Oxford, claims to have been a student of evolution for thirty years, and we may therefore learn from him the views held by the generation of Darwin's adherents who have followed him. He says: "Nature, so to speak, selects the best individuals out of each generation to live. As men by selection slowly but continuously improve their stock, so nature, by a similar process of selection, slowly but continuously makes the various species of plants and animals better and better suited to the condition of their life." Weismann, on the other hand, says: "Such a view is not strictly correct, for retrogression and degenerate forms play an important part in evolution." "There is no reason," continues Professor Romanes, "why we should set any limits to which this process is able to go."

He then condenses the arguments in favor of natural selection into four "facts," as he calls them. It must appear from the reading of these so-called "facts" that to so designate them is a peculiar use of language. They are theories, not facts. The first "fact" is the necessity for selection, because any one form of life would dominate the world if all its descendants were allowed to live. Does this theory not rather prove the necessity for the limitation of increase by destruction, the use of animals as food, and infertility? For food purposes the best specimens are selected, and this process would tend to deterioration. The second "fact" is this: "Nature is therefore always picking out or selecting the individuals best fitted to live." This theoretical process is therefore done by nature,

and not by the individuals themselves. The third "fact" is: "Individuals so selected transmit their favorable qualities to their descendants." If transmission is accepted, which theory is contrary to the teaching of Weismann's school as far as it applies to qualities acquired during the life of the individual, it must be allowed that unfavorable as well as favorable qualities may be handed down. The fourth and last "fact" is plainly on its face a theory. Professor Romanes says: "Our common mother, Nature (personified by a capital *N*), is able to distinguish between all her children. When an individual variation gives to that individual a better chance in the struggle for life, Nature (again with a capital *N*) chooses that individual to survive, and so to perpetuate the improvement in his or her progeny." Weismann has given the name Panmixia to the freedom all organisms possess to survive and commingle their variations. Panmixia intervenes therefore as a disturbing element, to prevent any orderly carrying out of the upward progress of natural selection, and to restore all variations to the architectural ancestral type.

In the next sentence Professor Romanes writes: "Now, I say that all these several component parts of Darwinian doctrine are not matters of theory, but matters of fact." Let us see where these facts lead him to, for it is probably in a different direction from that in which he desires to go. He personifies nature as an active, intelligent agent, ruling over organic life with a definite purpose, acting as a man does in cultivating his herds. He describes the individuals as selected without the exercise of their own volition for a purpose, and that is to make the various species better. On page after page he contrasts what he calls "the two rival theories of evolution and special creation," and in fact this comparison may be said to be the subject-matter of his book. Yet, when he comes to discuss the subject of natural selection, he is obliged to take refuge in a form of expression, which is only to be explained by the acceptance of the rival theory of special creation, which he is endeavoring to overthrow. Who is our common mother Nature? Why did he not give us a scientific definition of her? Where is her abode? How does she exercise her discriminating powers over her children?

He evidently has faith in mother Nature, in her wisdom and power and justice and goodness and truth. She must be, from his description, infinite and eternal and unchangeable.

After this, we read with a smile the last pages of his book, where he claims that "evolution has rendered the mechanical interpretation of nature universal," and where he thinks "the religious mind has suddenly awakened to a new and terrible force in the words of its traditional enemy, 'Where is now thy God?'" Professor Romanes will have to rewrite his anthropomorphic pages on natural selection, if he wishes the ordinary reader not to take his closing words as a *non sequitur*.

We can add to these explanations of Darwin and Romanes other meanings which are attached to the word Nature:—thus to the fortuitist it means chance, to the materialist it means the chemical and physical properties of matter, to the agnostic it means simply the play of forces in the organic and inorganic world, and to the theist it means a personal Creator. It becomes, therefore, a very convenient word, a symbol to which each one may attach his own particular meaning, and use it without compromising his views. It enables us to avoid Professor Lankester's sneer at American evolutionists, in that they have conspicuously abandoned the scientific method.

Having considered the views of Darwin and Romanes on natural selection, it remains to consider those of Weismann.

Professor Weismann does not disguise the difficulty he meets in attempting to incorporate the doctrine of natural selection into his theory of heredity. He walked upon firm ground when he was laying the foundation of his theory of the non-transmission of acquired characteristics. He has proved that doctrine beyond his power to recall it. But the task he has set before himself is to produce a complete system to account for the origin of species, and, like Darwin, he turns to natural selection, and says that the individual differences, caused by the various development of biophors, form the material out of which natural selection produces new species.

All his readers will assent to his remarks which follow this statement. He says:

"At first sight this conclusion appears to be very startling and almost incredible, because we are inclined to believe that the continued combination of existing difference cannot lead to their intensification, but rather to their diminution and gradual obliteration. Indeed, the opinion has already been expressed that deviations from the specific type are rapidly destroyed by the operation of reproduction."

This willingness to argue against his established convictions smacks of the pleader and not of the judge, and exposes Weismann to the criticism which he passed upon Darwin, and suggests the suspicion that he is only seeking what is necessary to assume in order to complete a system of heredity. Thus we see that Darwin, Romanes, and Weismann all progress bravely with their theories until they reach the crucial point of accounting for the origin of species. Then Darwin falters, and says natural selection is a bad term, that is, that it expresses on its surface the thought he wishes were true, but his scientific knowledge requires him to give it a meaning under which the thought breaks down. So Romanes, who is a faithful follower of Darwin, makes a break which is far more conspicuous. And then Weismann, returning to the same attack, and animated by the same purpose, actually surrenders the fruits of his greatest victory rather than acknowledge that there is conscious action in nature.

We see, from this difficulty which besets the path of these great thinkers, the true source of the strength of the theory of special creation. It accepts all that science has to say as to methods and chronology and development and evolution as a process, and when the point is reached where other theories break down, it offers the simple solution of the existence of a personal creator.

I must confess to much surprise when, to learn the most recent position of those who favor evolution, I took up Professor Romanes's book last summer and read his confession that there are but two rival hypotheses to account for the origin of species, evolution and special creation. For confession it must be called after all the arguments, scientific proofs, raillery and sarcasm, which have been ex-

pended in its overthrow. Spencer closes his chapter on the special creation hypothesis in these words:

"Thus, however regarded, the hypothesis of special creations turns out to be worthless—worthless by its derivation; worthless in its intrinsic incoherence, worthless as absolutely without evidence; worthless as not supplying an intellectual need; worthless as not satisfying a moral want. We must therefore consider it as counting for nothing in opposition to any other hypothesis respecting the origin of organic beings."

Remembering this attitude, which was originally taken by Spencer in 1852 and reaffirmed in 1864, and expecting rather to read in Romanes's book his belief that now all the thinking world was of one mind and that special creation was a forgotten myth, I say I was surprised instead of that to read that it was the one rival theory of evolution, and I said to myself, What, not dead yet, and after so many funeral orations? Surely this theory has a wonderful vitality.

A word must therefore be said of the present position of the doctrine of special creation.

It is the old belief contained in the words of Cicero—*Deus mundum aedificavit*,—God built the world. The fundamental idea of the special creationist is that of a conscious power working in and over nature. It is not against evolution or epigenesis, but against fortuity, chance, or spontaneous generation, or materialism, or the chemical theory. It is well described by Weismann in writing of Lamarckianism: "An ideal theory, an indispensable step which we must take on our way to the understanding of complex phenomena." It is a theory which personifies nature as Professor Romanes has done for us, and accepts natural selection in the sense Darwin and Wallace have taught us to receive it, as the selection by nature. It is held by educated men, not in the form satirised by Spencer, in that essay of his which Darwin so heartily applauded, but as a theory which answers more questions, solves more doubts, and raises more veils than any other which has ever been propounded by man. Though heavily weighted with the accumulated ignorance and superstition of all the ages, it is still the rival theory, because of such admissions as the following of Weismann: "I admit that spontaneous generation, in spite of all vain efforts to demonstrate it, remains

for me a logical necessity." And "I hardly think we shall ever reach the point of explaining vital processes by means of the well-known chemical and physical properties of matter, but until the explanation is proved to be impossible, it will in my opinion be unjustifiable for science to relinquish the attempt." Special creation therefore stands on the same footing as any scientific theory, as spontaneous generation, or materialism, an unprovable hypothesis, and yet to the vast majority of mankind a logical necessity.

We have now considered in rapid survey the theory of the non-transmission of acquired characteristics, of the germ-plasm and the continuity of life, of natural selection and the rival theories of evolution and special creation.

It remains to be asked what are the relations of these theories to each other, when brought together in the science of heredity, and it must be seen that if non-transmission and the continuity of life be accepted, then selection by nature and special creation coalesce under the definitions given them, and evolution becomes merely a description of the process and not of the power which accounts for the origin and variation of species.

A collateral result of the conclusions of heredity may be to shorten the world-chronology which it has been the fashion to lengthen indefinitely, and to modify but not supplant the fundamental biological and psychological beliefs of the ages.

THEODORE GILMAN.

SÉBASTIEN CASTELLION AND RELIGIOUS TOLERATION.

ONE of the last Frenchmen whom I met before starting from Paris in April was M. Ferdinand Buisson, Director of Primary Education in the Ministry of Public Instruction, a leading authority in France on all pedagogical questions and one of the founders of the public school system of that country. On leaving him, he presented me with two magnificent volumes * devoted to the humble life and lofty labors of Sébastien Castellion, the Franco-Swiss teacher, author, theologian, and reformer, one of the earliest and most fearless apostles of religious toleration; and he suggested that I give wider publicity to this work in the English-speaking world. This biography deserves indeed to be better known among us, both on account of the author and the subject; and hence the writing of this article, which is based mainly on a review of the work from the pen of Prof. Alfred Rambaud.†

In his Preface, M. Buisson says: "Ten times interrupted and each time for a long interval, the book was never entirely abandoned even when the author might have despaired of ever finishing it." Begun in 1865, the labor was not completed till last year. It was a heavy task. The study of the materials was in itself Herculean. Countless printed or manuscript documents which had to be examined were scattered through the libraries of cities, universities, and

* *Sébastien Castellion, sa vie et son œuvre* (1515–1563), *étude sur les origines du protestantisme libéral français*, 2 vols. in-8°. Paris, Hachette. A copy of this work will be found in the library of Cornell University.

† See *Revue Bleue*, Tome 50, No. 6.

churches in France, Germany, Holland, and Switzerland. The bibliography of Castellion's writings, giving their various editions from the middle of the sixteenth century down to our own day, and embracing their translations into all the tongues of Europe—this alone was an undertaking of no ordinary kind. In a word, as one of the reviewers truly says, "this book is a veritable encyclopædia of the Renaissance and the Reformation."

Who was Sébastien Castellion? M. Rambaud answers the question as follows on the authority of M. Buisson. We are told that he was one of the most learned humanists and professors of the sixteenth century. A Latin school book which he compiled had much the same success in Europe in those days as Webster's spelling-book has had in our own country during the present century. I refer to his "Dialogi Sacri" of which M. Buisson has unearthed not less than one hundred and thirty editions issued between 1543 and 1791, and to be found in all the important cities of Switzerland, Germany, and the Low Countries, in London, Edinburgh, and Dublin, and even in Spain and Hungary. His Greek and Latin poems, his translations from the Hebrew, Greek, and Latin, delighted the humanists of his time, while his translations of the Bible into Latin and French were events in the religious and literary worlds of that age. But the originality of Castellion lies in the private evolution of his religious mind, the affirmation of two or three great truths which he was among the first to proclaim, which he was among the most determined in supporting, and which mark him as one of the founders of several great Protestant sects and one of the earliest precursors of liberty of conscience.

Sébastien Castellion was born in 1515 in France near the Swiss frontier and studied at Lyons, then a famous seat of learning. When the Reformation burst upon the world, the little group of Lyonese humanists, who counted Castellion among their number, was immediately split in twain. One division submitted to Rome, but the second, to which Castellion belonged, revolted. What finally decided him to break with the old church was the terrible spectacle of the execution of heretics. In 1536, Jean Cormon, a peasant of Bresse near the birthplace of Castellion, perished in the flames

simply because he had colported the Bible. In 1538 Castellion learned that a book-seller, Jean de Lagarde, and a Toulouse student, had met a similar fate in Paris. Martin Gorain was drowned at Grenoble in 1536, while the following year witnessed the burning of several heretics in various parts of France. Finally, in Lyons itself, the very *alma mater* of Castellion, Cardinal de Tournon gave to the flames four poor souls in January, 1540. These cruel butcheries pierced the very heart of Castellion.

Up to this time the exact doctrine and meaning of the Reformation was not absolutely clear to Castellion nor to many others who were wavering like himself. But when, in March 1536, Calvin's "Institution Chrétienne" appeared, the Reformation became more definite in Castellion's mind. From that moment he may be said to have become a Calvinist. This book and the *autos-da-fé* decided his vocation. In the spring of 1540 he went to Strassburg and lived under the same roof with Calvin, paying his share of the expenses, it should be noted, and becoming one of Calvin's most devoted disciples. Calvin was then thirty-one years old and Castellion was his senior by three or four years. When the former was recalled to Geneva, the latter followed him and became, in 1541, the head of a college there. Then it was that Castellion published his "Dialogi Sacri" and began his translations of the Bible. He now desired to become a minister, but as he would not accept Calvin's interpretation of certain portions of the Bible, the latter refused to allow him to take holy orders. Castellion thereupon decided to break with Calvin and quitted Geneva. Thus began the struggle which is still going on between Liberalism and Orthodoxy.

When Castellion left Geneva he of course had to give up his college professorship which furnished himself and family with bread, and was consequently plunged into the deepest poverty. He applied for a position in the college of Lausanne. But there was no vacancy there. He moved on to Bâle where he became proof-reader in a printing-office belonging to one Oporin. His salary was so small, however, that, in order to have any fire at home, he had to fish out the wood found floating down the Rhine. But this terrible struggle for material existence was not the only burden he had to

bear. Calvin's hatred followed him everywhere. The public letters of the Genevese autocrat were widely circulated and all of them contained extravagant denunciations of Castellion. Finally, in 1552, this martyr to freethought found a momentary respite and became Reader in Greek at the Bâle university. Though he still lived in the most frugal manner, the wolf was no longer at the door. But this bitter experience did not weaken Castellion's moral courage. At that very moment he was girding his loins for a still fiercer struggle with his enemies in the church.

When Calvin put to death Servetus, only two men in all Helvetia dared lift up their voices in public protest. One of these was, of course, Castellion, who, notwithstanding the fact that Calvin had many and powerful friends in Bâle and that he endangered his newly-acquired position at the University, came out in a bold manifesto. It was indeed published under an assumed name—Martin Bellie—but everybody knew who the real author was. In order that his pamphlet should obtain the widest possible publicity, he issued it in both Latin and French, dedicating the first to the Count of Hesse and the second to the Duke of Würtemberg, whose dominions had accepted the Lutheran Reformation. This act brought down upon him a new storm.

When Castellion gave to the world his "De Hæreticis" and his "Traité des Hérétiques"—the pamphlets just referred to—his enemies had not yet forgotten the two prefaces which he had placed at the head of his Latin and French editions of the Bible. These were the first manifestos published in favor of liberty of conscience; the "De Hæreticis" and its French version were the second. This latter work went through many editions at Magdeburg, Strassburg, and other European cities. It was also known as the "Farrago Bellii," because of the mass of texts which it contained, borrowed from the early fathers, the chief reformers, from Luther himself, and all of which advocated toleration. Even Calvin was represented by one text, rather equivocal however, in which he preaches the employment of "science and not force," and in which he speaks of "the celestial melody of the Holy Ghost." Bèze, the *alter ego* of Calvin, answered Castellion in a pamphlet, which declares that it is

the right and duty of the Church to put heretics to death. This was the old doctrine of Rome and the Spanish Inquisition. All this made Castellion's pseudonym so famous that Bellianism and Bellianist became common terms in the religious discussions of that age, and continued to be such for years afterwards.

Apropos of this pamphlet, Professor Rambaud says: "It should be noted that Castellion is not a sceptic like Rabelais and Montesquieu, not a politician like the author of the 'Satire Ménippée.' He is as firm in the faith as the early martyrs of the Reformation, as sturdy a theologian as Calvin or Theodore de Bèze. His taking up the principle of toleration was not brought about by feelings of French patriotism, of political wisdom, of humanity, nor even of pure Christian charity. No, it was from a scrupulous study of texts that he was led to accept this doctrine. It was his conviction that toleration was the veritable spirit of Christianity and the Reformation. It was from theology itself that he drew his arguments against the excesses of theologians."

In the "De Hæreticis" no mention is made of the destruction of Servetus, which really called forth the pamphlet; or at least it contains only very vague allusions to this crime. But this act of momentary abstention was not to be taken to mean that Castellion feared to attack his powerful foe in this vulnerable spot. Scarcely was the ink dry on the other pamphlet when he finished the manuscript of "Contra Libellum Calvini," in which he turns his attention to Calvin himself and his recent reprehensible act. He says: "Today John Calvin enjoys great power, and I would wish it still greater if he were only animated by more kindly sentiments. But his latest action is a bloody murder, and his latest publication is a direct menace to the lives of many pious men." Then the brave author gives the details of the execution and refutes point by point Calvin's theories. But neither this work, nor the "Annotation sur l'Épître aux Romains," which was written in the same spirit, could be printed. Castellion's former publications had created too great a sensation and had worked too much harm to the Calvinists, to permit him to continue to print *ad libitum*. So the censor was called upon to act, and even in the free city of Bâle he was strong enough

to suppress Castellion. The tractate circulated only in manuscript copies.

Castellion was always on the side of humanity and gentleness, as opposed to the cruelty and barbarism of his age. Torture, as a means of forcing confessions from accused persons, was then countenanced by all the jurists of Europe, and religious innovators might be pardoned, perhaps, if they accepted the practice. But at least one voice was raised against it, and it spoke exactly as did Montesquieu and Voltaire two centuries later. Here, as everywhere, Castellion was to be found opposed to Calvin. Somebody objected: "But many guilty persons will escape if torture is abolished." Castellion answered: "No law calls for the punishment of unknown crimes; be contented to punish those that are known."

Calvin, as everybody knows, believed in predestination. Castellion took up the other view. Thereupon the former attacked him again and directed Bèze to do the same. "How long will you suffer to dwell in your midst this shameful fellow, this clot of mud, this pest?" wrote Bèze to the magistrates of Bâle. Castellion, in his turn, called upon the magistrates of Geneva, but mark the difference of tone and purpose. He said to these recreants, while he urged them to become men and put an end to this intolerance: "For the love of Christ, I beg of you, I conjure you, to leave me in peace and to cease persecuting me. Grant me the freedom of my faith and the freedom to profess it, just as I do in respect to you and yours. If there are those who separate themselves from you, do not declare forthwith that they turn their backs on the truth, do not fall upon them as though they were blasphemers. Taking religion as a whole, I am not in disaccord with you. It is the same Christian religion which I, like you, delight to serve. On certain points of interpretation only, I, with several others, hold different views from you. Let the most learned, then, be also the most charitable!" These words sound as if they were written to-day, instead of over three centuries ago. One might think them to have fallen from the pen of the Rev. Mr. Briggs! This shows how far in advance of his time was Sébastien Castellion, or rather how far behind the times is modern Protestantism.

Castellion was not simply a musty theologian; he looked upon religion with the mind of a practical statesman. At the time when the civil and religious wars were raging in France, he wrote, in 1562: "Keep up the two forms of religion—the Roman Catholic and the Protestant; let both be free, so that everybody may choose, without constraint, the one he prefers." This was the view Henry IV. took of the matter in 1598, when he promulgated the edict of Nantes; and this is the view liberal France has been striving to maintain ever since, even down to the present year of grace.

"With Castellion on the one hand," says Professor Rambaud, "and Calvin, backed by Theodore de Bèze, on the other, the conditions of this theological duel were not equal. The latter were supported by the State, by the public authorities, by the courts, and by the public executioner. They had with them the presses; and, more than this, by the aid of the Geneva censor and the information which was furnished them through the censorships in the other Helvetian states, they could prevent the publication and circulation of the replies and attacks of their opponents. Several of Castellion's most powerful tractates never saw the light in book-form. He was not even secure from bodily harm even at Bâle. In 1563 an attempt was made to get him implicated in a trial brought against a family of Anabaptists which ended with the disinterring and the burning of the bones of one David Joris. At Bâle at least, the *autos-da-fé* were made only with dead bodies."

Insulted by men who were once his friends and teachers, railed at by the multitude, continually in danger of finding himself and family deprived of their daily bread, his very life threatened, Castellion, worn out by bodily deprivation, mental strain, and moral disappointment, died in 1563 at the early age of 48, just as he was on the point of losing his university chair and of being banished from Helvetia. His enemies eagerly took upon themselves to preach his funeral oration. Theodore de Bèze recalled how he had prophesied to him that "the Saviour would soon punish him for his blasphemies." Bullinger wrote: "Castellion is dead. Good!" Gwalter remarked that in order not to have to plead his cause before the Bâle Senate, Castellion had "appealed to Rhadamanthus."

For a century and a half after his death Castellion's writings were known to the learned and the theologians. His books and manuscripts were read by the pious. In the sixteenth and seventeenth centuries two of the greatest Protestant sects—the Socianists and the Arminians—claimed him as one of theirs. The liberal wing of French Protestantism is a son of his doctrine, while here in the United States many of our churches may look upon him as one of their founders. In M. Buisson's final chapter entitled "Posthumous Influences," attention is called to the close union between Castellion's doctrines and those held by Roger Williams and Anne Hutchinson. Of him then it may be truly said that though the body be dead the spirit still liveth.

M. Buisson's first volume contains a portrait of Castellion drawn by the distinguished French artist Jean Paul Laurens after the portrait engraved for Castellion's Latin Bible, edition of 1729. This is the only portrait of him known to exist. "To this cold and dry engraving," says M. Buisson, "M. Jean Paul Laurens has been able to give life without detracting from its austerity." We are further told that the artist undertook the work out of "sympathy, awakened after reading several chapters, for the humble hero of this book."

THEODORE STANTON.

THE GERMAN UNIVERSITIES AT THE WORLD'S FAIR.

HOW much has been said and sung of the academic liberty of German universities! Academic liberty means freedom of research. It implies the independence both of professors and students. The professor is not controlled in his work; he is not commanded what to do or to teach; he is thoroughly independent and, he cannot be removed from his place. He investigates as he pleases and he lectures to his auditors as he sees fit. Nor does the professor in turn exercise any control over his students. They study if they choose to do so, and, if they prefer it, they may neglect their studies. And the students do not hesitate to make use of their liberty. Many talented youths who do not possess sufficient self-discipline go to the wall, under this system. This is a pity, but so long as the principle of academic liberty prevails, it cannot be helped, and, for that reason, no one in Germany proposes a change in the principles according to which the universities are administered.

Academic liberty has left an indelible imprint upon the German university; it has shaped its life, institutions, and by-laws; yet the most important result it has produced is what may be called "the scientific spirit of the German university. While the French and English universities are advanced schools, whose business it is to educate or to teach, the German university is above all other things a temple of science. The appointment and advancement of a German professor does not depend upon his ability to teach but almost exclusively upon his accomplishments as an investigator. Had Darwin lived in Germany he would most likely have been found among

the university professors, for Germany's greatest thinkers, with few exceptions, have lived and completed their lives in academic circles. The German professor is first an investigator and then a teacher. German universities are institutions devoted to the search for truth, and the scientist, the philosopher, the searchers for truth serve at the same time as instructors of the German youth.

The German university consolidates scientific research in a great coöperative body of scholars. Thus it is adapted to give specialised instruction in all the various branches of science and yet it keeps every student in close communion with all other studies, so that the unity of knowledge is not lost from sight. In this way a scientific atmosphere is created which makes the labors of every one that breathes it more efficient. An isolated thinker, even if he had all the books and instruments of his specialty and of collateral sciences as convenient as he finds them at the university, cannot accomplish as much as the man who receives, almost without his being conscious of it, innumerable suggestions and helps from his colleagues in other branches, and is, as it were, carried on the wings of their common aspirations.

The German university system has often been criticised, but criticism has only given it strength and shown its great advantages. The question has been raised, Would not teachers be better as educators than savants? Many professors are incompetent as instructors and even as lecturers! Nevertheless, the direct contact of the students with the great representatives of scientific inquiry outweighs all disadvantages. The German youth receives the most powerful stimuli and invaluable suggestions from his personal intercourse with the thinkers of his time.

All the members of the German universities jealously guard their academic liberty and look upon it as one of the most sacred heirlooms of the German nation. And rightly so, for it creates boldness of research, it promotes progress, and has in times of need proved the last redoubt even of political freedom.

Academic liberty makes the German university of kin to the constitution of our country. No wonder that between the German university and the United States a deep sympathy obtains. We

Americans at least have, on our part, always regarded the German university system as the best realisation of the noblest ideal of all higher education. We have not tried slavishly to copy it, but we imitate it, and attempt to adapt its methods to our special wants. There are no doubt features that cannot be recommended, but certainly the spirit that animates the German university must and will find and to some extent has already found a home on this side of the Atlantic, in the country of political liberty and humanitarian aspirations.

* * *

Considering the importance of the German universities to our country, we joyfully greet their well-planned and excellently arranged exhibit at the World's Fair in Chicago, and here offer to our readers a brief review of this unique display of the ways, the means, and the summarised results of German science.

Where that grand bronze statue* of Germania on horseback, accompanied on her right hand by Strength, on her left by Renown, towers above the German exhibit in the Liberal Arts and Manufactures Building, a double stair-case leads the visitor directly to the heart of the place allotted to the German universities. Here we stand upon their court of honor. We find no exhibit in the proper sense of the word. There are, however, some portraits and statues chastely ornamented with a few gilt acorn, myrtle, and laurel wreaths. Alexander von Humboldt's portrait in large proportions stands prominently before us. Very attractive are the oil pictures of Von Ranke, the historian, Wilhelm Weber, Kekulé, and A. v. Hofmann, the chemist. There is a bronze statue of Kant in full figure and a number of busts, among which we note in the centre the young Emperor; around him and along the aisle, Helmholtz, Kirchhoff, Luther, Schleiermacher, Leibnitz, Liebig, Gauss, and others.

A glass case contains autographs of the very greatest Germans. There are two documents, the one signed by a flourish of Charlemagne, the other sealed by Otto the Great with his own hand; letters of Luther, Frederick the Great, William the First, Goethe,

* The statue is destined to adorn the Reichstag building in Berlin.

Schiller, Kant, Lessing, Grimm, Schleiermacher, and Winckelmann.* Plans, elevations, and photographs of the various university buildings in big folios bound in leather are exhibited on desks. Near by are the libraries, showing their methods of shelving and cataloguing books ;† to the left we have the physical and mathematical, to the right the bacteriological and physiological sections.

There are several monumental works of German patience and industry, such as Grimm's "Wörterbuch" and the various "Corpora Inscriptionum." We find among them Wenker's "Sprachatlas," a new enterprise which shows in a simple and systematic manner the linguistic boundaries of Europe. Three hundred characteristic words have been selected and their pronunciation in the various villages carefully noted down by the schoolmasters, according to the directions of a circular letter. The result is easily surveyed in the maps. The work is as yet incomplete, and it is estimated that it will comprise about nine hundred folio charts.

The mathematical section surprises us with its wealth of mathematical models. French mathematicians in the Fifties, still under the influence of Monge, were the first to understand the great value of embodying in visible form their abstract space-constructions. Not he who computes with arithmetical methods but he who has an intuitive conception of spatial relations is the true mathematician, and how can the latter quality be better developed than by models that show at a glance all the complexities which it is sometimes so difficult to realise by abstract imagination. German mathematicians have learned from the French, and it appears that they now excel their masters. It is astonishing how much has been accomplished in this branch of education in the last twenty years.

There are several cases of Brill's models, many of which owe their origin to the exercises which were held at Munich by Pro-

* It is not our purpose to enter into details, but we may mention incidentally that some of the letters admirably characterise the men and the nation to which they belong, in their noblest sentiments; especially the letter of Frederick the Great; while others, for instance Kant's letter, thanking a friend for a gift of Teltauer turnips, are of a trivial nature.

† For the details of German Library institutions consult Dr. Dziatzko's *Denkschrift*, and P. Schwenke's *Addressbuch*, both on exhibit.

fessors Brill and Klein in 1877–1885, showing surfaces of the second, third, and fourth degrees, "Kummer"-surfaces, cyclides, surfaces of constant curvature, geodetic lines, asymptotic curves to surfaces, and other mathematical forms. The thread models (made by Wiener of Karlsruhe and Karl Rohn of Dresden) present a beautiful appearance and are especially calculated to excite the curiosity of the uninitiated. Professor Schwarz of Berlin shows us a few Riemann-surfaces in bodily realisation. Dr. Sievert (teacher at the Gymnasium at Nürnberg) materialises surfaces of positive curvature. The wire models of Dr. Victor Schlegel (of the Gymnasium at Hagen) represent projections of four-dimensional bodies in three-dimensional space. There are also crystal models and graphical diagrams of various descriptions.

The practical importance of a vivid mathematical imagination, to educate which these models are excellently adapted, lies mainly in the fields of mechanics and physics.

The energies of the mathematician, formerly so much occupied by computations, are now more employed in the properly mathematical fields, while comptometers will alleviate his work by calculating his examples with less trouble and with unfailing mechanical accuracy.

We find the Meyer addition machine, and a number of comptometers, among them Grimme's, the Russo-German *Brunswiga*, and a very interesting instrument called the *Selling Rechenmaschine*. The latter is built on the principle of the lazy tongs, or, as the Germans call it, the "Nürnberg shears." It is known that if the axis in the first link be moved one unit, the second will move two, the third three, the fourth four, and so on. The Selling machine contains ten seven-linked lazy tongs with wheels for the decimal transfer and can execute in a purely mechanical way multiplications and divisions of any number of nine figures with any number of seven figures. The result appears typewritten on paper up to thirteen places, which for common use will be sufficient. A few numbers of frequent occurrence, such as π, can be called up by pressing a certain button.

The machine will have a great fascination for Americans. Its principle is simple enough, but its application is still very complex, so that its practicability must remain doubtful. At least, it seems

to us, that such American machines as the Felt comptometer are better for practical purposes.*

The physical section contains many historical curiosities, such as Guericke's air-pump and the Magdeburg hemispheres, part of the wire of the very first telegraph, invented by Gauss and for practical purposes improved by Morse, and, in addition, many original instruments of Weber, Gauss, Kirchhoff, and Helmholtz.

At the time when Gauss made his telegraphic experiments he wrote under his picture these English words :

"Thou, Nature, art my goddess!
To thy laws my services are bound."

The psychological department contains instruments invented and used by Helmholtz, C. Stumpf (Munich), W. Wundt (Leipsic), Goldscheider (Berlin), Ewald Hering (Prague), and Ebbinghaus (Berlin).

At the other end of the University exhibition we find the anatomical section. There are microtomes of different make, and several good preparations. The anatomical models are good, but do not reach the neatness and accuracy of detail which we admire in Dr. Auzoux's "clastic anatomy" at Paris.

Professor Flechsig's hand-made diagram of the nervous paths in the nervous system deserves particular attention, embodying, as it does, the very latest results, most of which were made by Flechsig himself. It is to be hoped that this chart, with its manuscript explanations covering no more than twenty or thirty manuscript pages, will soon be published, so that it may be accessible to all interested in the anatomy of the brain.

One staircase higher leads us to the Botany exhibit, which appears in the shape of large-sized flower models; to the Zoölogy exhibit, showing hand-made wall pictures of apes, while Dermatology wisely covers the most important part of its demonstrations.

* The Brunswiga works by a crank; it adds and subtracts, multiplies and divides. In the Felt comptometer the keys perform the work automatically; in addition, this machine finds the square and cube roots of numbers. It seems to be much used in business. Cornell University, I am informed, employs three Felt comptometers in its various departments, while a fourth one serves for purely educational purposes.

We must resist the temptation to describe at length the exhibits of other sciences, such as astronomy, with its various branches, chemistry, mineralogy, hygiene, surgery, ophthalmology, and others, and will merely state that the bacteriological department exercises a great attraction for physicians and laymen. There are the vials, tubes, and hatching-stoves of Koch and his colleagues; there are the nests and colonies of the various pure cultures in bodily presence; there are the photographs of these criminals a thousand times magnified; and the white powder exhibited in tubes and displayed in one of the cases contains the very poisons with which they bring about their nefarious results. A small case in the corner of the room shows us the antidotes, which, according to experiments made on animals, will neutralise the effects of the tetanus and some other bacilli.

* * *

In addition to these exhibits, the German universities have given to the world a two-volume digest of large octavo size which in a few more than a thousand pages briefly reviews the work accomplished in the various branches of science. "These accounts," so we read in the preface, "are not intended to recapitulate the progress of science generally, but only to indicate how far the German universities have contributed to it. That, accordingly, the merits and accomplishments of foreign science were excluded from detailed recognition and appreciation must of course not be interpreted as the result of a desire to make the work of the German universities unduly prominent. On the contrary, the German universities will remain fully conscious of how much they owe in their scientific aspirations to the labors of other nations."

The editor of the work is Prof. W. Lexis, the prominent Economist of Göttingen. The first volume begins with an essay on the German university by F. Paulsen of Berlin; it is a fascinating description of its history and present conditions (pp. 1–111) supplemented with statistical tables by J. Conrad, of Halle (pp. 111–168). The special sciences are arranged according to the faculties and are reviewed as follows:

Theology is divided into two parts. The Evangelical faith is

represented by E. Haupt, E. Kautzsch, F. Loofs, M. Kähler, and H. Hering, while the Catholic doctrine is treated by G. Hoberg, J. Felten, B. Fechtrup, P. Schanz, F. X. Heiner, and H. Keller.

Professor Haupt says (p. 180):

"The theological faculties, though in point of form completely free, are yet a real coadjutor of the practical work of the Evangelical Church. If conflicts arise—and in our day they frequently do arise—between their work and that of practical ecclesiastical circles; if it is complained that intellectual critique now almost exclusively occupies the time of students and that the young people are unfitted for service to the congregations of the church: the academical theologians will certainly not deny that many imperfections still adhere to their work. But they are convinced that any one-sidedness that is thus produced will be overcome by the further scientific and religious education of the students and especially by their work in pastoral fields. In fine, we must have patience, and must look for reconciliation between faith and science, in the individual as well as in the whole church, from a steady coöperation of these two factors, and see that such a reconciliation can only be slowly and gradually effected. Theological science is an integral part of the totality of science, an integral aspect of church-life generally, and finally, a means of creating in the holders of practical church-offices independence of judgment and sureness of action."

The position of Roman Catholic theology is greatly simplified. Professor Hoberg regards Franz Kaulen's treatment of exegesis as epoch-making. "Kaulen," he says, "defines biblical isagogics as a justification of the ecclesiastical doctrine anent inspiration and the canonical character of the Scriptures, therefore, subsuming it under apologetics." "Thus," he adds, "it acquires a strictly scientific character, so that this form of treatment will forever serve the Catholic Isagogist as a model."

The problem which perplexes Evangelical theology does not exist to Hoberg. As if intending a reply to the above-quoted passage of his evangelical colleague, he says (p. 240):

"If the works of Catholic exegetists in the Old Testament field fall short in number of those of non-Catholic scholars, this fact is chiefly due to the circumstance that biblical research in the Catholic sense rejects as a matter of principle many theories of non-Catholic research, and, consequently, has no reason to treat these theories scientifically."

It is encouraging to see that Professor Haupt does not despair of a final satisfactory solution of the theological problem.

Prof. O. Fischer, of Breslau, has written as an introduction to the section of jurisprudence an essay on the general study of law. Ernst Eck, of Berlin, treats of Roman law, which, we ought to add, is unduly neglected in England as well as in America. The other juridical branches are represented by H. Brunner, of Berlin; E. Strohal, of Göttingen; K. Kossack, of Freiburg i. B.; O. Fischer, of Breslau; F. E. von Liszt, of Halle; G. Meyer, of Heidelberg; F. von Martitz, of Tübingen; L. von Bar, of Göttingen; R. Sohm, of Leipsic; J. Kohler, of Berlin; and A. Merkel, of Strassburg. The statistical appendix is by Guttstadt, of Berlin.

The philosophical faculty, which in almost all German universities comprises everything that does not belong to the three others, is divided into two groups, the humaniora, and mathematics and the natural sciences. J. Baumann of Göttingen offers an admirably condensed synopsis of the evolution of German philosophy since Leibnitz. Wundt describes the psychophysical institutes and their work. Philology, including history and archæology, is represented by N. v. Wilamowitz-Möllendorff (Classics), K. Weinhold (German), A. Brandl (English), A. Tobler (Romance), E. Sachau (Oriental), F. Kielhorn (Sanskrit), K. Brugmann (Comparative), H. Zimmer (Celtic). Modern History is treated by Th. Lindner, History of Art by Hermann Grimm, and Political Science by H. Dietzel (economy and finance), E. Gothein (the evolution of the science of economy), and W. Lexis (statistics).

Mathematics and Natural Science constitute a faculty of their own only in Tübingen, Strassburg, and Heidelberg. Professor Lexis, the editor of the present work, found it convenient to treat them in a special section which appears as the first part of the second volume.

Prof. F. Klein sketches the tendencies of mathematical investigation during the last two centuries. Gauss inherited all the traditions of Leibnitz, Bernoulli, Euler, Lambert, Lagrange, D'Alembert, and Maupertuis. Unsurpassed in exactness of proof, he introduced new views and new methods and he again imparted his spirit to a number of disciples whose mission it is to develop in harmonious coöperation the various branches of mathematics. In addition to him we find such men as Jacobi, Clebsch, and Dirichlet. Jacobi's

maturest work is his theory of elliptical functions; Clebsch received the most fruitful suggestions for his algebraic conceptions from the English mathematicians Cayley and Sylvester. Of Dirichlet, whose labors were closely allied with French thought, may be mentioned his theory of numbers and his mathematical physics. Grassmann stood outside the academical circles, which was the cause of his tardy recognition. Steiner, a more isolated thinker, was powerful through his original one-sidedness. Riemann proceeds from Gauss and Dirichlet, whose conceptions he combined with Cauchy's ideas of the application of complex variables; Clebsch forms a contrast; he is complementary, as it were, to Riemann; and his tireless energy was not satisfied with his academic work. He founded with C. Neumann the *Mathematische Annalen*, a magazine which still exists and has now reached its forty-second volume.

In addition to the Göttingen School we have the Berlin School represented by Kummer, Kronecker, Weierstrass, and also the Polytechnica which are the main home of those mathematicians who, according to the French ideal, apply mathematics to technical industry. Representative of this latter class are Redtenbacher of Carlsruhe and Culmann of Zürich.

We pass over the accounts of (II) Astronomy by H. Seeliger, (III) Physics by A Kundt, (IV) Chemistry and Chemical Technology by O. Wallach, (V) Physical Chemistry by W. Ostwald, (VI) Mineralogy and Crystallography by Liebisch, (VII) Geology and Palæontology by K. v. Zittel, (VIII) Botany by E. Strasburger, (IX) Zoölogy and Comparative Anatomy by R. Hertwig, (X) Anthropology by J. Ranke and Ethnology by E. Grosse, (XI) Geography by H. Wagner, (XII) Meteorology by W. v. Bezold, (XIII) Farming by J. Kühn, (XIV) and Forestry by Professor Lehr,—all of which contain much interesting detail. We quote one passage in full because we trust that the subject commands a general interest. Professor Hertwig concludes his article as follows (pp. 109–111):

"We should acquire a very imperfect notion of the course of development which zoölogy has taken in this century in German universities, if we were not to take into account the tremendous influence which the Darwinian theory has exercised. In no country did this theory find such quick acceptance, in no country has

it so completely dominated scientific life, as in Germany. It may be said that to-day all teachers of zoölogy and comparative anatomy are more or less pronounced adherents of the idea of evolution. Among the men to whom this rapid introduction of Darwinism in Germany is to be attributed, is to be mentioned, above all, Ernst Haeckel, who in many treatises and especially in his General Morphology, which has deepened the spiritual contents of zoölogy in many directions, has done more for the methodical development of the theory than any other inquirer. Next to Haeckel, O. Schmidt, Weismann, and M. Wagner (of München) have taken a prominent part in the controversies of this question.

"If we go more minutely into the manner in which Darwin has acted on German zoölogy, two elements of Darwinism must be sharply distinguished: (1) the theory of descent, which it has in common with earlier theories of evolution; and (2) the causal establishment of descent by means of the struggle for existence, by which it is distinguished from the other theories. The doctrine of the struggle for life has met with quite unequal assent in Germany. One energetic champion of the theory has arisen in Weismann, who explains the transformation of species wholly by this method, rejecting other causes, such as the influence of environment and the use and non-use of organs which Lamarck emphasises, for the reason that acquired characters are not hereditary. On the other hand, there have been no lack of voices which have disclaimed for the struggle for existence all influence whatever in the development of species. M. Wagner especially has opposed the Darwinian theory, enunciating and defending with great acuteness the doctrine of migration, by which new species can have arisen only through geographical isolation.

"It may be said generally, that the disputes indicated have not been pursued with the same ardor by German zoölogists as they have, for instance, in England. For German zoölogy, Darwinism in its narrower sense stood less in the foreground than the theory of evolution which received new life through him. Besides, evolution has assumed a distinct stamp in Germany, and one which is deeply grounded in the character of German zoölogy.

"The train of thought which led Darwin to the enunciation of his theory was preëminently the train of thought of the systematician, who sought to acquire a clear conception of the value of the notions species and variety. In Germany, however, it is the morphological side of the theory of descent that is especially cultivated. It is here sought, by comparative anatomical and developmental studies, to establish the natural relationship of living animals, in order to clear up in this way and to demonstrate the historical development of the animal kingdom—its "phylogeny" as Haeckel calls it. The endeavour is made to derive the more complicated organs of higher animals from the simpler states of embryos and lower organisms, with a view of obtaining an insight into the laws of formation of organs and of revealing the connexion between the facts of anatomy and developmental history—a connexion for which Haeckel gave the explanatory formula in his biogenetic law. By these tendencies comparative anatomical and developmental research necessarily received

fresh impulses, and the zoölogy of Germany thus affords us the interesting spectacle of the successful coöperation of two great intellectual movements. The development of the theory of descent in German universities was prefigured by the morphological tendency of German research, and in its turn this theory also exercised a determinative and fruitful influence on morphology. Morphology and the theory of descent are thus the two factors that now dominate the zoölogical research of the German universities and that probably will dominate it for some time to come."

The report of the medical faculty opens with a careful survey of the present state of anatomy (pp. 187-233) by W. Waldeyer of Berlin. Physiology is sketched by L. Hermann, the editor of the six-volume *Handbuch*. The constantly increasing import of pathological anatomy is forcibly set forth by R. Virchow (pp. 241-261) who believes that pathological chemistry will in the future become more and more indispensable. The revolution that took place in the treatment of internal diseases through and since Virchow is reported by H. v. Ziemssen. The progress made in surgery is reviewed by J. Mikulicz. Since Lister's innovation, surgical operators became bolder than ever; German surgeons have slowly changed the antiseptic method into a purely aseptic one. Names such as Bruns, Billroth, Volkmann, Langenbeck, Bergmann, and others are famous, and their successful operations have astonished the world. Gynæcology is summarised by H. Fritsch, the Treatment of Children's Diseases by A. Baginsky, Ophthalmology by A. v. Hippel, Psychiatry by Ludwig Meyer, Dermatology by A. Neisser, Diseases of the Throat and Nose by B. Fränkel, Otology by H. Walb, Dentistry by F. Busch, Pharmacology by C. Binz, Hygiene, which since Pettenkofer has become an independent and indeed an important branch of medicine, by C. Flügge, and Forensic Medicine by Skrzeczka.

It would be unfair to expect the report of the German universities to be complete; it is at best a fairly approximate summary which is to some extent influenced by the preferences of the various contributors. It is but natural that Göttingen and Berlin are noticeably prominent, Berlin as the capital of Modern Germany and Göttingen as the university at which Anglo-American traditions are still prevalent. To criticise omissions, where, according to the

reviewer's taste, more should have been said, would be unfair. Some subjects have been neglected, modern logic, for instance, has been entirely dropped. But we must bear in mind, first, that it would be all but impossible to satisfy all *desiderata*, secondly, that the whole work had to be completed in three months, and, thirdly, that it is a courteous gift which does honor not only to the giver, that magnificent body of German savants who constitute the German universities, but also to the American nation whose respect and good opinion our brethern beyond the Atlantic solicit in such a kind and amiable way.

* * *

America is often ridiculed as the land of the almighty dollar. Germans especially are disposed to believe that our people are materialistic and devoid of all ideals. This is a misconception. America is perhaps the most idealistic country in the world. Americans, it is true, are practical, and mean to be that, but they are not materialistic. We can unhesitatingly say, that should a million dollars, or several millions, be wanted in any one of our great cities, New York or Chicago or San Francisco, for some enterprise of urgent communal interest, be it a hospital, a school, a life-saving station, or what not, the money would be pledged within a day, if but the men who undertook the work were a guarantee that the plans would be properly executed and the institution serve its purpose. If we measure the idealism of a country in foot-pounds of energy that people expend in its service, if we measure it by the sacrifices voluntarily made for ideals, there can be no doubt that America ranks first among all the nations of the world.

The World's Fair at Chicago is indeed characteristic of the spirit that animates American character. There has never before been an exhibition in which the purely commercial interests were so much overshadowed by the higher and nobler purposes of national education. The managers of the World's Fair have made everything subservient to the one thing needed, that is to raise the civilisation of the people and to improve their minds by instructing and by entertaining them. The World's Fair imparts information, it educates, and it teaches a great object-lesson. The administration is

certainly not without faults, yet upon the whole it has been conducted, according to the intention of the shareholders, so as to ensure an ideal rather than a financial success. Gain or loss was regarded as a matter of subordinate consideration.

The exhibit of the German universities accords most harmoniously with the general plan of the World's Fair at Chicago. It is very welcome and we are grateful to the men to whose labors we owe the instructive and successful execution of such a valuable work.

We do not wish to glorify our country in any vain spirit, for we are by no means blind to its many imperfections. We know that there are many drawbacks to our political and social conditions, but we are at the same time confident of national improvement. The spirit of a practical idealism will conquer in the end, and those elements which expect to prosper by corruption will perish.

We believe in liberty; we enjoy its benefits and accept the consequences of an ill-employed liberty, also. Our people have themselves to blame if they suffer from the vices and errors of their magistrates and legislators. They must learn by experience. Many of our political institutions, especially our civil service, need reform. As they are at present, we observe that rectitude and a faithful attention to duty are not always rewarded, while dishonesty is often actually at a premium.

Considering the vicious system of our civil service, we must be lenient in judging the corruption that prevails in many of its branches. We should rather say it is, after all, marvellous that conditions are not worse. It is comparatively easy for the employees of the German Government to be and to remain honest, for so long as they attend to their duty, they are safe in their positions, and no emperor or governor or superintendent can remove them. A change of policy in the government only implies a change of the chiefs of the various departments. Would European officers maintain their well-deserved reputation for honesty and efficiency, if they were suddenly transplanted into such conditions as prevail under our faulty system?

The evils that appear in our national and social life are bad enough; they lie on the surface and obtrude at once on every one

who visits our country. But they are not irredeemable; they are set off by great and solid virtues. He only who feels in his own heart the pulse of the most sacred aspirations and hopes of this nation, can appreciate the grandeur of its rare possibilities.

Moreover, the evils that accrue from a wrongly applied liberty are educational; they will impel us to advance on the road of progress. They will force us to raise the general standard of civilisation. They impose a great duty upon us, which, we grant, is very difficult to perform; but the performance of this duty will create a nobler and higher type of humanity. Those who have no faith in ideals and the power of ideals, who have no confidence in progress and the higher possibilities of mankind, naturally regard the task as impracticable. While we are fully aware of all the difficulties, we yet do not despair of the situation. There is a divinity in the world that aspires to incarnation; and this divinity is still alive in mankind. Through errors and true knowledge, through adversities and prosperity, through misery and happiness, through good and evil times, through despair and hope, through sin and saintliness, folly and wisdom, the God in man struggles onward. The mass of mankind may be ever so wretched, the ideal will sprout and develop like a mustard-seed, and its growth will astonish the faint-hearted.

We shall have to pass through many sad experiences, but it is certain that in the bracing air of freedom the fittest will survive, and fitness is inseparably bound up with morality.

Freedom, be it academical or political, is not favorable to the weak; it proves destructive to those who lack independence or self-control; the unfit must fail. Yet the results are not to be deplored.

Recognising the kinship between the German university system and the institutions of our own country, we say, the greatness and the glory of German science are due above all to its academic liberty, and the promising future of our national hope depends mainly upon the right use we shall make of our ideal of freedom.

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THE recent work of M. J. Novicow, *Les luttes entre sociétés humaines et leurs phases successives*, forms an interesting contribution to social science. The author, by birth a Russian, has already published a book in our language, *La politique internationale*, which has been the subject of much comment. Works of this kind, once said a distinguished German to me, labor under the misfortune that they are not read by statesmen, and that the scholars and students who read them are unable to apply their teachings. This objection does not absolutely hold, for the general thought of mankind, which in the end always impresses itself on governments, is continuously modified by the secret infiltrations of books, and, as M. Novicow himself writes, "it is only by acting on public opinion that we can hope ever to control the world."

This large work—it contains not less than seven hundred and fifty pages—would have gained much by being abridged and more thoroughly systematised. Filled with indifferent facts, a severe revision would greatly increase its worth. But I do not wish to cavil: more important criticisms claim our attention.

In reviewing the general arguments by which M. Novicow connects his conception of human society with the leading ideas of biology and astronomy, we discover at once that, with all the sociologists of our time, he has absorbed the powerful influence of Comte. But he has also acquired from the English school the faculty of painstaking care and the laborious consideration of details. "It is owing to the neglect," he writes, "which has prevailed till the pres-

ent time, of a careful examination of almost imperceptible facts that sociology is still so far behind the other sciences." For the foundations of his work, he directly borrows from Darwinism the principles, now so widely diffused, which the simple phrases "struggle for life," "survival of the fittest." "adaptation," etc., will suffice to evoke in all minds. He is not, indeed, the first to apply the ideas of evolution and competition to social phenomena. But his work is precisely executed; and if the conclusions which he presents do not all clearly and indubitably proceed from his biological premises, it must yet be acknowledged that he reaches results to which these premises give greater solidity and which have, thus, infinitely more chance of being exact. Sociology, in the present state of affairs, cannot give us more.

The fundamental thesis of M. Novicow is accordingly this: that the struggle between the component groups of human society is a prolongation of the great struggle for life which rules the whole animate world: that it is continued here in many different forms peculiar to social phenomena, and that all our efforts should be to bring it about that this struggle produces progress and justice, that is to say, "an acceleration of adaptation." And to establish the equivalence of these factors, the biological and the moral, so often supposed contradictory, is the task on which M. Novicow concentrates all his powers.

According to him, the biological law is constantly transforming itself into moral law; a contention which he proves by a contrast of the struggle for life as it was in the past with what it has become in the present and probably will become in the future. In proportion as the social aggregations of humanity have become more and more perfected, the competition of life has taken higher forms: the purely physiological, or animal, struggle has been followed by economical and political struggles, and finally, by intellectual struggles, and in each of these successions of facts we have beheld processes more rational and rapid take the place of the old faulty and tedious ones. I must refer the reader to the book itself for the full development of all these points, and restrict myself here to pointing out in a few lines the general solutions of the author: in the economical

order are opposed, the vices of protectionism, which is at bottom nothing else than "the spoliation of the capable at the expense of the incapable," and the salutary practice of free trade; in the political order the free association of social groups takes the place of the illusion of great states, the state of peace succeeding the state of war, which can be nothing more than a simple pathological accident; in the intellectual order, religious persecution, constraint under all its forms gives way to spiritual activity, to the free communication of minds through space; in fine, the suppression of the idle and factotum state, and of the frightful fiscal tendencies which are its expression: the liberty for every individual of living where he thinks best, and also for each group of associating itself with the nationality which it may select; the voluntary federation of states instead of the so-called equilibrium of powers; "an intense upward movement, the ardent struggle and victory of the better, realised with the greatest possible rapidity."

Some will reproach M. Novicow with having set up here a theory of individualism—even to the extent of establishing an idividualism of collective groups—at the very moment when this doctrine has produced its last excesses. To which our author might reply that these excesses are such only in appearance, and that it is now time to stop in the movement of reaction which is carrying us headlong into the abyss of state-socialism, the most ruinous of tyrannies. Others will accuse him of attempting to build in the air an imaginary republic. But he knows the difficulties with which he has to deal, he does not reckon without the factor of time, and it is the briefness alone in which I have here expressed his doctrines that makes them appear so extreme.

No, M. Novicow does not dream of an idyllic society. He is bold without being adventurous, and free from prejudices without being revolutionary. It is primarily in the interests of real gain, understood in its best sense, that he protests against the erroneous doctrines of the old society, and it indeed seems at times as if he were "beating down open doors." But it often happens that open doors close behind us, and, besides, we have within us, almost without exception, a double nature, that of our scientific instruction and

that of our prejudices. Our conduct is a perpetual compromise between the men which we were yesterday and that which we shall be to-morrow. In the eyes of the child there is no reason that the design of society should change any more than should the profile of the mountains on the horizon. The majority of men preserve this infantine illusion and cry ever for an Utopia. Meanwhile, the world changes without cessation, and in the end *all* is accomplished—even that which is reasonable.

* * *

M. F. R. PAULHAN'S new book, *Joseph de Maistre et sa philosophie*, carries us a good ways from M. Novicow, far behind him, and also far in advance of him. To Joseph de Maistre, and in the point of view from which he is usually regarded, the future is only the mirage of the Catholic past, or that past the rough outline of the future. It is this idea which M. Paulhan has so well placed in relief. The personality of Joseph de Maistre, so interesting to French thought, should not be less so to American thought. Certainly every reader will derive benefit from the book of which I am now speaking, a brief, excellent and precise study, the best which we yet possess on this rare writer and original thinker.

Here we may see what secret bonds unite the most dissimilar minds; how much, different philosophies modify the same facts; and how greatly, also, the force of facts can reduce the divergencies of different philosophies! I extract from a page of De Maistre these passages: "In the vast domain of animate nature open violence reigns, a species of foreordained anger that arms all creatures *in mutua funera*: the moment you pass from the kingdom of insensible matter you find the decree of violent death written on the very boundaries of life . . . . a philosopher can even discover how this eternal carnage is foreseen and ordered in the great All. . . . The entire earth, constantly saturated with blood, is but an immense altar, on which all that lives is immolated, endlessly, immeasurably, without relaxation, till the consummation of things, till the extinction of evil, till the death of death." Here is the law of the struggle for existence, formulated with sombre energy a half a century before Darwin. But it does not assume in the doctrine of Maistre its

"natural" purport. For him, pain and war are the *expiation* of the evil of the world. Men are one with each other; each is satisfied through the other. War, moreover, involves an advancement towards what has always been our dream, *unity*. It is of no consequence here that Joseph de Maistre wished to realise temporal unity by means of a "king," and spiritual unity by the Pope. His conception of unity and his view of the enigma of pain make him turn his eyes to the future. For this Catholic and Christian thinker, religion does not possess its supreme value so much in virtue of its dogmas as in virtue of the unity of beliefs and habits that it realises, i. e. by the quantity of common feeling which it creates. War, if an expiation, is the indicator of our progress towards that unity, that "accord," the ultimate sign of which will be the disappearance of evil. "Evil," writes Maistre, "is the schism of life, it is untruth."

If we put these things in other words, and picture to ourselves other political processes and other details of operation, we shall not be so far from Maistre as we think. M. Paulhan is right. "If we will but transpose, so to speak, the thought of Joseph de Maistre, and interpret it in a slightly different manner from what it has been, we shall not only enjoy the beauty, but shall also apprehend the truth of his ideas, and, to a great extent also, of his general theories."

M. PAUL SOURIAU has recently published a book entitled *La suggestion dans l'art*. There is, in this interesting work, no lack of facts or of subtle expositions. But I have some objections to its thesis—that art is a matter of suggestion. If we simply *compare* the effect produced on us by a work of art to the effects of hypnotism, the comparison is admissible and offers striking hints. But if we *identify* æsthetic pleasure with hypnosis, we commit, in my judgment, a singular abuse of language. And if, finally, we advise the student, in order to augment the effect of art, to have recourse to hypnotic methods, the artist will soon have a public formed only of "suggestible" individuals *par excellence*, that is, of hysterical and degenerate subjects. M. Souriau, unfortunately, does not fully adhere to his comparison. He seeks to explain the enjoyment of art

as a species of hypnosis, and he would go perhaps to the extent of accepting a theory of hallucinatory dreams produced by the combined seductions of smell, sight, hearing, and touch. A chaste hallucination, of course, in which the artist would not address the senses, but would acquire a mastery of souls and cause the beautiful dreams of his own mind to pass into those of others!

I oppose theses of this sort always, in whatsoever form they appear.

When we make the charm of art consist of hypnosis, we neglect too much the importance of the specific sensation without which there is no true art. And this is exactly what M. Souriau does, despite his delicate artistic sense. He sets too little value on the pleasure attached to the simple sensorial perception, and he does not perceive that by following that inclination he arrives at an æsthetics of Ruskin, and enrols himself among the Pre-Raphaelites, or in the neuropathic school of art. If the sensation of hearing or of sight plays in music or in painting so slight a part, it will no longer be worth one's while to become a Rembrandt or a Beethoven. A colored scarf that blinds the eyes, a tom-tom that deafens the ears, will fulfil equally well our purpose. If hypnosis is the perfect state of emotion, there is no need of great effort to put us to sleep, nor even to procure for us agreeable dreams. As to the means of putting the hallucinations into our poor little brains, if the artist could ever become the magician that M. Souriau pictures him, he would not be slow, alas, to abuse his power and would soon be banished from all free states.

But things really come to pass in a more simple manner, both in the artist who creates, and in the hearer, the spectator, who admires. M. Souriau knows this well, and he is too good a psychologist to be given a lesson on this point. But he has yielded to the temptation of pushing a seductive analogy to extremes; he has forgotten that "comparison is not reason," that analogy is fraught with dangers, and that one should be careful in the reduction of all phenomena of a class to a single principle, lest we lose track of the whole.

It would be easy for me to add to these criticisms, in con-

nexion with a work of Wundt's which has just been published in French, under the title of *Hypnotisme et suggestion.* Wundt vigorously combats here Schmidkunz's theory, which I also contested in the *Revue philosophique*, that all psychical facts, from simple perception to the noblest artistic and social creations, are nothing but "suggestions." But I shall not insist here on these points, as I have also a few words to say of another attempt, quite different, but equally adventurous, in the field of æsthetics.

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M. MAURICE GRIVEAU, in his *Éléments du beau, analyse et synthèse des faits esthétiques d'après les documents du langage*, has set himself the task of making an inventory of language, with the view of discovering in such an inventory the elements of the beautiful, or, more exactly, the reason and the value of æsthetic judgment in all fields. One of our best-known poets, M. Sully Prudhomme, attempted a similar task; but he did not aim at the same end as Griveau, whose object is none other than to establish a numerical æsthetics, that is to say, to refer our judgments of taste to operations of "unconscious mathematics."

What kind of relation, the reader will ask, can possibly exist between such a mathematics and the adjectives of the languages we speak? Picture to yourself a vast lexicological table where all qualificative words are arranged in two crossed directions, first, in a vertical direction, according to their qualitative value (in the hierarchical order of the sensations, from the most elementary to the most complex), second, in a horizontal direction, according to their quantitative value, (forming a scale indicating the increase of intensity of sensations). This table arranged, he deduces from it—I cannot enter into details—two principal facts. The vertical arrangement of epithets shows us that language always passes from the symbolism of "reflexes" to the expression of "states of consciousness"; for example, from a subjective point of view, *alléchant, rafraîchissant, agréable*; from an objective point of view, *sucré, doux, bon.* The horizontal order reveals a curious fact, that the extreme terms of every lexicological gamut are pejoratives, (thus, *glacial* and *brûlant, fade* and *âcre, imperceptible* and *assourdissant*), the interme-

diary terms generally remaining favorable for starting from a middle point, or rather from a mean zone of indifference.

Now, these various zones of a gamut have their exact physiological expression. The table of qualificative words can be translated by a "gradual contrast," passing, through different states, from increasing inhibition to the left to increasing dynamogeny to the right. The mediocre answers to the just mean; at the intermediary points the feeling becomes æsthetic; at the extremes the organic sensation alone dominates, and we reach the limits where impression becomes painful. "Imagination completes its rôle of appreciation when sensibility begins its rôle."

But are not our internal states, thus placed in relief by language, correlated with the exterior rhythm of things? Does there not exist an objective ideal, the positive sum of harmonies and dissonances, to which our different states of physiological ease and disease attach themselves? In fine, can there not be disengaged from some such scheme of human speech a graphic system whose chief lines blend with that of the *oscillation of some correspondent reality*? These are the questions that have led M. Griveau to the theory of numerical æsthetics, and in this domain he has found a coadjutor in M. Charles Henry, whose patient and difficult researches I shall some day discuss.

In the want of other positive results, the inquiry of M. Griveau will furnish at least a confirmation, quite unexpected, of the theory of Spencer and Grant Allen, according to which "an æsthetic feeling is at bottom only a weakened physiological sensation."*

LUCIEN ARRÉAT.

* All these works are published by Alcan.

CRITICISMS.

OBSERVATIONS ON SOME POINTS IN JAMES'S PSYCHOLOGY.

III. WILL.

Although I have already quoted the remarks with which Professor James opens his chapter on this subject, they are of sufficient importance to warrant repetition:

"Desire, wish, will, are states of mind which every one knows, and which no definition can make plainer. We desire to feel, to have, to do, all sorts of things which at the moment are not felt, had, or done. If with the desire there goes a sense that attainment is not possible, we simply *wish*; but if we believe that the end is in our power, we *will* that the desired feeling, having, or doing shall be real; and real it presently becomes, either immediately upon the willing or after certain preliminaries have been fulfilled."

With this statement of the case I am in entire agreement. With two slight qualifications, it seems to me to include all that is essential in volition. I should supplement it by saying that the desire for the thing in question must be stronger than for anything that is perceived to be incompatible with it, and that it must be thought of as attainable by our own exertions. Although we may wish for the sunrise, and believe that our wish can be realised, we do not will it.

Professor James, on the contrary, unless I entirely misapprehend his meaning, devotes the greater part of his chapter of more than a hundred pages to an elaborate attempt to show that this statement is, if not incorrect, at least very incomplete; that the fundamental, essential thing in will is not desire, but attention. Desire, according to his view, is one of the principle things which may fix our attention on an object, and thus excite voluntary action, but it is only one among many causes which may bring about the same result.

It will perhaps tend to simplify the discussion if I state at once that, so far as this point is concerned, the difference between us is, at bottom, one of definition. The question is whether certain acts, taking place under conditions described by him, are properly called voluntary. With his statement of the facts I have little fault to find, but it seems to me that the inferences which he draws are calculated to introduce confusion in regard to matters which are, for practical purposes, clear

in the minds of plain people. To save space, I must pass over many things with which I agree, and which are admirably put, to come to the essential point of difference. I must, however, call attention to his able, and, to my mind, convincing argument against the existence of what Wundt and his followers call the "feeling of innervation." It seems to me that he shows, beyond reasonable doubt, that, so far as this feeling has any existence, it is due to the sensations arising in the parts concerned in the movement, of which it is thus a result.

The starting-point of the argument is the unquestionable truth that voluntary movements, being intended beforehand, must be movements of which we have previous knowledge from their having been involuntarily performed.

". . . . if, in voluntary action properly so called, the act must be foreseen, it follows that no creature not endowed with divinatory power can perform an act voluntarily for the first time. Well, we are no more endowed with prophetic vision of what movements lie in our power, than we are endowed with prophetic vision of what sensations we are capable of receiving. As we must wait for the sensations to be given us, so we must wait for the movements to be performed involuntarily, before we can frame ideas of what either of these things are. We learn all our possibilities by way of experience. When a particular movement, having once occurred in a random, reflex, or involuntary way, has left an image of itself in the memory, then the movement can be desired again, proposed as an end, and deliberately willed. But it is impossible to see how it could be willed before" (p. 487).

"If I will to utter the word *Paul* rather than *Peter*, it is the thought of my voice falling on my ear, and of certain muscular feelings in my tongue, lips, and larynx, which guide the utterance. All these are incoming feelings, and between the thought of them, by which the act is mentally specified with all possible completeness, and the act itself, there is no room for any third order of mental phenomenon. There is indeed the *fiat*, the element of consent, or resolve that the act shall ensue. This, doubtless, to the reader's mind, as to my own, constitutes the essence of the voluntariness of the act. This *fiat* will be treated of in detail further on. It may be entirely neglected here, for it is a constant coefficient, affecting all voluntary acts alike, and incapable of serving to distinguish them. No one will pretend that its quality varies according as the right arm, for example, or the left is used.

"*An anticipatory image, then, of the sensorial consequences of a movement, plus, (on certain occasions) the fiat that these consequences shall become actual, is the only psychic state which introspection lets us discern as the forerunner of our voluntary acts*" (p. 501).

Coming, now, to the point upon which the whole discussion hinges—the relations of "ideo-motor" action to voluntary action, he says:

"The question is this: *Is the bare idea of a movement's sensible effects its sufficient mental cue, or must there be an additional mental antecedent, in the shape of a fiat, decision, consent, volitional mandate, or other synonymous phenomenon of consciousness, before the movement can follow?*

"I answer: Sometimes the bare idea is sufficient, but sometimes an additional conscious element, in the shape of a fiat, mandate, or express consent, has to intervene and precede the movement. The cases without a fiat constitute the more fundamental, because the more simple, variety. The others involve a special compli-

cation, which must be fully discussed at the proper time. For the present let us turn to *ideo-motor action*, as it has been termed, or the sequence of movement upon the mere thought of it, as the type of the process of volition."

[We have seen, above, that our author speaks of the fiat as "the essence of the voluntariness of the act . . . . a constant coefficient, affecting all voluntary acts alike." If this be true, I admit that I am unable to understand how acts from which it is absent can be taken as "the type of the process of volition." Let us see what sort of facts are to be considered under this head]:

"Wherever movement follows *unhesitatingly and immediately* the notion of it in the mind, we have ideo-motor action. We are then aware of nothing between the conception and the execution. All sorts of neuro-muscular processes come between, of course, but we know absolutely nothing of them. We think the act, and is done; and that is all that introspection tells us of the matter. Dr. Carpenter, who first used, I believe, the name of ideo-motor action, placed it, if I mistake not, among the curiosities of our mental life. The truth is that it is no curiosity, but simply the normal process stripped of disguise. While talking, I become conscious of a pin on the floor, or of some dust on my sleeve. Without interrupting the conversation, I brush away the dust, or pick up the pin. I make no express resolve, but the mere perception of the object, and the fleeting notion of the act, seem of themselves to bring the latter about. Similarly, I sit at table after dinner, and find myself from time to time taking nuts or raisins out of the dish and eating them. My dinner properly is over, and in the heat of the conversation I am hardly aware of what I do, but the perception of the fruit and the fleeting notion that I may eat it, seem fatally to bring the act about. There is certainly no express fiat here, any more than there is in all those habitual goings and comings and rearrangements of ourselves, which fill every hour of the day, and which incoming sensations instigate so immediately that it is often difficult to decide whether not to call them reflex rather than voluntary acts We have seen in Chapter IV that the intermediate terms of an habitual series of acts leading to an end are apt to be of this quasi-automatic sort. . . .

"In all this the determining condition of the unhesitating and resistless sequence of the act seems to be *the absence of any conflicting notion in the mind.* Either there is nothing else at all in the mind, or what there is does not conflict. The hypnotic subject realises the former condition. Ask him what he is thinking about, and ten to one he will reply 'nothing.' The consequence is that he both believes everything he is told, and performs every act that is suggested." (Pp. 522–523.)

I have no fault to find with the above statement of the facts, nor do I think that Professor James at all exaggerates the importance of the part played by ideo-motor action in our conduct. Its relations to voluntary action, however, require a little further examination.

It is probably true, in a sense, that ideo-motor action is, psychologically, a more simple process than action with a conscious motive, but it does not follow that it is more fundamental. When the skilful pianist plays a difficult piece of music at sight, his attention is fixed on the notes before him, and his fingers go instinctively to the right keys, without any more of a conscious "fiat" than the general

purpose to play the piece as it is written. So far as the movements are concerned the psychological process is infinitely simpler than when, as a beginner, he practised his exercises with his mind fixed on the position and movements of his fingers, but I think there can be no doubt that the latter is the fundamental thing. Now, this is a type of the origin of ideo-motor action. It is, I think, invariably developed out of voluntary action. We learn to walk, to talk, to write, with close attention and infinite labor, but by repetition the channels in our nervous systems get so worn that less and less of effort is required in forcing the passage, until, finally, any sensation or thought habitually associated with the act is sufficient, in the absence of some inhibitory force, to instigate the movement. If this be true, voluntary, not ideo-motor action, must be considered the fundamental thing. I cannot think of any exception to this, unless primarily instinctive acts should be classed as ideo-motor. Much might be said in favor of this view, but this hardly seems the place for such a discussion. It will be sufficient to admit that, in such cases, acts which were originally performed from an unreasoning impulse may come to be done with a view to their consequences.

The involuntary character of ideo-motor acts is recognised, elsewhere, by Professor James himself :

"A man says to himself, 'I must change my shirt,' and involuntarily he has taken off his coat, and his fingers are at work in their accustomed manner on his waistcoat buttons." (P. 519.)

Our so-called absent-minded acts are ideo-motor. I have lately taken to carrying the key to a room, where I have frequent occasion to go, in my pocket, and for some time after I began doing so I invariably went to the drawer where I had formerly kept it, when I had occasion to go to the room, not because I supposed the key to be there, but because that action had become, in my mind, an integral part of the process of visiting the room.

If there remains, in any one's mind, a doubt of the involuntary character of such acts as we have been considering, it should, I think, be dissipated by the consideration of the notorious fact that they are often performed, not only without our will, but against our will. Every one who has undertaken to break himself of bad habits must be familiar with this. We commit the faults we are trying to correct during the practice of exercises undertaken for that express purpose Ideo-motor and voluntary action are most intimately associated and shade off imperceptibly into each other, but they are not the same, and, instead of the former being the type of the latter, I think it is evident that pure ideo-motor action is not voluntary at all.

The simplest type of voluntary action seems to be when it follows a desire that is not opposed by any contradictory feeling. Of this sort, and not, strictly, ideo-motor, seems to me to be the action described in the following passage by Professor James :

"We all know what it is to get out of bed on a freezing morning, in a room without a fire, and how the very vital principle within us protests against the ordeal. Probably most persons have lain on certain mornings for an hour at a time unable to brace themselves to the resolve. We think how late we shall be, how the duties of the day will suffer; we say, 'I *must* get up; this is ignominious," etc.; but still the warm couch feels too delicious, the cold outside too cruel, and resolution faints away and postpones itself again and again, just as it seemed on the verge of bursting the resistance and passing over into the decisive act. Now, how do we *ever* get up under such circumstances? If I may generalise from my own experience, we more often than not get up without any struggle or decision at all. We suddenly find that we *have* got up. A fortunate lapse of consciousness occurs; we forget both the warmth and the cold; we fall into some reverie connected with the day's life, in the course of which the idea flashes across us, 'Hollo, I must lie here no longer'—an idea, which at that lucky instant awakens no contrary or paralysing suggestions, and consequently produces immediately its appropriate motor effects. It was our acute consciousness of both the warmth and the cold during the period of struggle, which paralysed our activity then and kept our idea of rising in the condition of *wish* and not of *will*. The moment these inhibitory ideas ceased, the original idea exerted its effects.

"This case seems to me to contain, in miniature form, the data for an entire psychology of volition. It was, in fact, through meditating on this phenomenon in my own person that I first became convinced of the truth of the doctrine which these pages present, and which I need here illustrate by no further examples." (P. 524.)

Judging by Professor James's statement of the case, and comparing it with my own experience in similar circumstances, I should say that what he had in mind at the critical moment was not merely the thought of the act of getting up, but the thought that he ought to get up. The act, accordingly, is done with a motive, which, for the moment, meets with no opposition. To class it, as I understand Professor James to do, with acts done automatically, without motive or purpose, seems to me to be losing sight of a very important distinction.

I have quoted the greater part of what Professor James has to say on this head, partly on account of its importance in his argument and partly to enable my readers to decide for themselves what his opinion really is as to the relations of ideo-motor and voluntary action—a point on which I am not clear in my own mind. On the one hand, as we have seen, he speaks of the former as the type of the latter; on the other, he calls some ideo-motor acts involuntary.

My own opinion is, that those acts, and no others, are properly called voluntary, which are done purposely, intentionally, by choice. When this is the case, no matter how simple or how unhesitating the action, it is voluntary; when it is not the case, no matter how complicated the act or what its results, it is involuntary.

Passing to the subject of action after deliberation, I will not attempt to follow Professor James's discussion in detail, but, before taking up the points in which I differ from him, will call attention to some points which he passes over, in regard to the grounds of deliberation.

Deliberation may be in regard to the means by which we may attain an end already desired, or in regard to the ends themselves. In the former case, we may be in doubt whether the thing desired is attainable, or, which amounts, practically, to much the same thing, whether it is attainable without the sacrifice of something which we value more highly, as when an honest man doubts whether he can obtain an office which he would like by honorable means. Or, it may be a question of the best means of securing an object thought of as attainable in various ways, as when a man hesitates as to the route he will take in a journey on which he has determined. In cases like these, in which the hesitation is merely on intellectual grounds, the decision, when our doubts are resolved, is made without effort. Even in cases in which we are obliged to act in important matters on insufficient knowledge, although there may be a feeling of reluctance to commit ourselves to what may turn out to be a wrong course of action, there is none of the sense of renunciation of which we are often conscious in the other class of choices.

When two desirable objects are clearly perceived to be incompatible, we only hesitate when the opposing motives are, for the time being, of equal weight in our minds. If the choice is between matters that we feel to be of little importance, we may be willing, without any decided preference, to let the matter be decided by chance. A change in the way in which the motives are presented to the mind, or in our mood, may give such a preponderance to one set of motives, that a decision, which, a short time before, seemed impossible, shall be made without misgiving. The opposing motives, for the time, sink into insignificance, and we are conscious of no effort in renouncing the one good for the other.

When, on the other hand, at the moment of decision, two incompatible goods are strongly desired, and the inclination to one only gains a slight preponderance over the other, the renunciation of one for the other is only made with a feeling of effort. It is in regard to the circumstances under which this feeling arises that I must next take issue with Professor James.

The view of the matter which seems to me unsatisfactory is stated as follows:

"The states of mind which normally possess the most impulsive quality are either those which represent objects of passion, appetite, or emotion,—objects of instinctive reaction, in short; or they are feelings and ideas of pleasure or of pain; or ideas which for any reason we have grown accustomed to obey, so that the habit of reacting on them is ingrained; or, finally, in comparison with ideas of remoter objects, they are ideas of objects present or near in space or time. Compared with these various objects, all far-off considerations, all highly abstract conceptions, unaccustomed reasons, and motives foreign to the instinctive history of the race, have little or no impulsive power. They prevail, when they ever do prevail, *with effort*, and the normal, as distinguished from the pathological, *sphere of effort is thus found whenever non-instinctive motives to behavior are to rule the day.*" (P. 536.)

Of course, if we proceed *a priori* and define the line of least resistance as the line that is followed, the physical law must hold good in the mental sphere. But we *feel*, in all hard cases of volition, as if the line taken when the rarer and more ideal motives prevail were the line of greater resistance, and as if the line of coarser

motivation were the more pervious and easy one, even at the very moment when we refuse to follow it. He who under the surgeon's knife represses cries of pain, or he who exposes himself to social obloquy for duty's sake, feels as if he were following the line of greatest temporary resistance. He speaks of conquering and overcoming his impulses and temptations.

"But the sluggard, the drunkard, the coward, never talk of their conduct in that way or say they resist their energy, overcome their sobriety, conquer their courage, and so forth. If in general we class all springs of action as propensities on the one hand and ideals on the other, the sensualist never says of his behavior that it results from a victory over his ideals, but the moralist always speaks of his as a victory over his propensities. The sensualist uses terms of inactivity, says he forgets his ideals, is deaf to duty, and so forth; which terms seem to imply that the ideal motives *per se* can be annulled without energy or effort, and that the strongest mere traction lies in the line of the propensities. The ideal impulse appears, in comparison with this, a still small voice which must be reinforced to prevail. Effort is what reinforces it, making things seem as if, while the force of propensity were essentially a fixed quantity, the ideal force might be of various amount. But what determines the amount of the effort when by its aid an ideal motive becomes victorious over a great sensual resistance? The very greatness of the resistance itself. If the sensual propensity is small, the effort is small. The latter is *made great* by the presence of a great antagonist to overcome. And if a brief definition of ideal or moral action were required, none could be given which would better fit the appearances than this: *It is action in the line of the greatest resistance*" (pp. 548–549).

It seems to be plainly implied in the foregoing passages that the feeling of effort, in the sense in which the term is used here, only arises in the case of a conflict between "ideals" and "propensities," in which the former prevail. This does not strike me as in accordance with the facts. So far as I can see, all that is necessary is that the alternative which is renounced should still be strongly desired. In fact, in another passage, Professor James seems to admit that such may be the case:

"Whether it be the dreary resignation for the sake of austere and naked duty of all sorts of rich mundane delights, or whether it be the heavy resolve that of two mutually exclusive trains of future fact, both sweet and good, and with no strictly objective or imperative principle of choice between them, one shall forevermore become impossible, while the other shall become reality, it is a desolate and arid sort of act, an excursion into a lonesome moral wilderness" (p. 534).

The second of these supposed cases does not seem to involve a choice between more and less ideal motives, and I think the experience of every one will supply him with instances enough in which we are called upon to decide how we shall use our time or our money between things which seem equally legitimate objects of desire, neither of which can be easily given up. Shall a man devote his leisure time to literature, science, travel, or social intercourse; his limited means to the purchase of books or works of art; shall he get the good of the present hour, at the risk of future destitution, or spend his time and hoard his means for provision against a future day which he may never see? In such cases as these, one set of motives need be no more instinctive than the other, but I fancy that there are few who have not experienced a feeling of effort in making such decisions.

But even in choices between "ideals" and "propensities," I do not think it is true that the feeling of effort is confined to the cases in which the former prevail. Nothing is more instinctive than the love of life; nothing more ideal than the love of truth; yet I do not believe that it was without an effort that Galileo repudiated his deepest convictions, nor do I doubt that those martyrs who were made of sterner stuff found it easier to die for the truth than to deny it. I do not even believe that non-instinctive motives always prevail with effort. An honest man need not be conscious of an effort in refraining from pocketing his neighbor's spoons when he has the opportunity. Patriotism, benevolence, a sense of honor, religious principle may take such possession of the mind of a man who is by no means destitute of feelings of self-interest that there will not be a moment's hesitation if they conflict. Benjamin Franklin had a very keen eye for the main chance, but I do not believe that he would have felt a pecuniary bribe to betray his country as very much of a temptation. I have no doubt that at the present time there are among Professor James's pupil's men who "scorn delights, and live laborious days," joyfully and enthusiastically, for the love of knowledge or the hope of fame, for intellectual or physical preëminence. What would a member of the Harvard foot-ball team say to the proposition that his resolution to give up his wine and cigars rather than that the athletic glory of his *alma mater* should be dimmed was "a desolate and arid act"? This is a hard enough world as it is, but it would be much harder if the pursuit of the ideal were always such dreary business as seems to be implied in the passages quoted above.

I think, then, it is sufficiently clear that the feeling of effort in making a decision does not either uniformly or exclusively accompany those decisions in which the less instinctive, more ideal motive carries the day. Nevertheless, it certainly is true that in cases in which what we feel to be the higher motive prevails, we do say and feel that we have been victorious; that our efforts have overcome the temptation. The reason of this, it seems to me, is that we feel that we are more truly ourselves in our calm, dispassionate moments, than in the presence of a powerful temptation. Even in the struggle, we feel that if we do what we have condemned beforehand, we shall regret it afterward.

I do not, accordingly, believe that "action in the line of greatest resistance' has any more place in the moral than the physical world. If a man, at the moment of decision, loves ease more than fame, or fears death more than dishonor, he will follow the prompting of the stronger feeling as surely as the stone falls to the ground or the sparks fly upward. The whole aim of moral education is to render the line of our ideals that of least resistance—to make it easy to do right, and hard to do wrong. It is not completely successful until right action is a delight. I suspect it may have occurred to some of my readers, after having successfully resisted the temptation to do some discreditable act, to feel, not proud of the victory, but ashamed that it should have cost a struggle.

Of the section on "Pleasure and Pain as Springs of Action" I will only say

that it does not seem to me to be pertinent to the subject under discussion. To show, as Professor James does, that reflex, instinctive, and emotional acts are not excited by the thought of the pleasure or pain that is to result from them, throws no light on the phenomena of will, if we follow him in considering them all primary performances, as contrasted with voluntary movements, which are secondary functions of our organism (p. 487). Whether we are to call all the incentives to voluntary action pleasures and pains or not, does not seem to me very important. Professor James seems to think, for example, that sympathy, as a motive, is an instance to the contrary. I should say that, in my own case, sympathy is a pleasure in the happiness and pain in the suffering of others, but if he does not find it so, and thinks I am mistaken in so thinking, I will not quarrel with him. But it is important that we should not lose sight of the distinction between voluntary and involuntary actions. When we wish, desire, choose, prefer, to do an act, rather than to abstain from acting or to do something else, then, and only then, in my view of the matter, is it voluntary.

I have already discussed the matter of ideo-motor action in this relation. In the case of morbid impulsion, which he instances, the condition seems to be much the same as in many cases of instinctive or habitual action. If there is no opposing motive, the impulse produces its appropriate muscular actions. I had once under my observation an insane girl who had an uncontrollable impulse to tear her clothing into strips, tie knots in the ends of the strips and bite them off. She realised perfectly well what she was doing, and talked very sensibly about it. She would say she didn't know why she did it; it was a great pity; her mother could not afford to have the clothing destroyed, but she couldn't help it, all the time going on with the work of destruction. She was not by any means destitute of feelings of delicacy, but that did not deter her from destroying her clothing to the last rag if it was not sooner replaced. Although she did not appear to take any pleasure in the work of destruction, I do not doubt that it would have been intolerably painful for her to refrain from it for any length of time. A person contending against such an impulse is like one hanging by his hands over a precipice. He does not expect any pleasure in letting go, but the effort of holding on becomes intolerable, and he very likely lets go when he is not physically incapable of holding on a little longer.

We may now proceed to consider the author's views on the subject of the relation of Attention to Will.

"In closing in, therefore, after all these preliminaries, upon the more *intimate* nature of the volitional process, we find ourselves driven more and more exclusively to consider the conditions which make ideas prevail in the mind. With the prevalence, once there as a fact, of the motive idea, the *psychology* of volition properly stops. The movements which ensue are exclusively physiological phenomena, following according to physiological laws upon the neural events to which the idea corresponds" (pp. 559–560).

"We have now brought things to a point at which we see that attention with effort is all that any case of volition implies. *The essential achievement of the will,*

in short, when it is most 'voluntary,' is to attend to a difficult object and hold it fast before the mind. The so-doing is the *fiat*; and it is a mere physiological incident that when the object is thus attended to, immediate motor consequences should ensue" (p. 561).

"*Effort of attention is thus the essential phenomenon of will.* Every reader must know by his experience that this is so, for every reader must have felt some fiery passion's grasp. What constitutes the difficulty for a man laboring under an unwise passion of acting as if the passion were unwise? Certainly there is no physical difficulty. It is as easy, physically, to avoid a fight, as to begin one; to pocket one's money, as to squander it on one's cupidities; to walk away from, as towards a coquette's door. The difficulty is mental; it is that of getting the idea of the wise action to stay before the mind at all." (Pp. 562–563.)

Now, nothing can be clearer to my mind than that in such a case as this, it is nothing but the presence of the idea of the wise action in the mind that causes us to hesitate. Without it, we should follow the dictates of passion immediately, without hesitation or misgiving. So far is it from being universally true, as argued by Professor James in the following sentences, too long for quotation, that reasonable ideas will always prevail if they can get a fair hearing, that it has passed into a proverb that "the woman who deliberates is lost." When we have decided beforehand how we ought to act in the presence of a temptation, everybody knows that the only safe course, when the emergency arises, is to act first, as we had resolved, and reflect afterwards. That is not the time for a quiet hearing of the arguments which oppose our passion. Reason may, it is true, come out victorious in such a contest, but the advantage of position is with the enemy.

But what is the process in case that, after deliberation, we follow our propensity rather than our ideal? It seems to me that it is the rarest thing in the world for us to drop the motive to the contrary course out of sight. Usually, one of two things happens: either we persuade ourselves for the time that we may escape the consequences of our folly, or passion gets such a mastery that we determine to brave them. The difficulty is not at all in getting the reasonable course of action to stay before the mind; it is that, in comparison with the opposing motive, it does not seem desirable, as when we consider both dispassionately.

Granting, for the sake of the argument, that we may, by an effort of attention, exclude one or the other of two sets of motives, between which we are undecided, from the mind, the question still remains, how we come to make this effort of attention. According to Professor James: "We never make an effort to attend to an object, except for the sake of some remote interest which the effort will serve." (Vol. I, p 416.) That is, if I understand him, voluntary effort is effort prompted by desire. The schoolboy, studying a dull lesson, recalls his wandering thoughts to the book before him again and again, because, for one reason or another, he wishes to learn his lesson. His father, in his shop or his office, takes pains to fix in his mind a multitude of uninteresting details—the prices of various commodities, the names, residences, occupations, and tastes of a multitude of persons in them-

selves indifferent to him, because he expects and wishes to turn the knowledge to pecuniary profit. Many unwelcome things force themselves on our attention, but my readers must have differently constituted minds from mine if they can imagine themselves making an effort to attend to a thing which at the same time they wish to banish from the mind.

The relation of attention to will, therefore, seems to me precisely the reverse of that asserted by Professor James. Voluntary attention, like voluntary muscular action, is the *result* of will. If we desire to make a movement, and nothing hinders, the movement comes to pass. If we desire to attend to something, we attend to it, for the moment, at least, and the relation of the desire to its accomplishment seems to me strictly analogous in the two cases. In the one case, the muscular movement, in the other, the attention, is thought of as the means of securing the desired end. If either comes to pass in any other way than as a means to a desired end, I deny its voluntary character.

When Professor James says, as already quoted, that "the essential achievement of the will . . . is to attend to a difficult object and hold it fast before the mind," it is evident that the object to which he refers is not the action itself, but its consequences. When I hesitate, for instance, whether or not to make a purchase, which I feel I can ill afford, it is not the action of taking the money out of my pocket and handing it over that occupies my thoughts, but the idea, on the one hand, of the pleasure of possessing the desired object, and, on the other, of the inconvenience of not having the money it would cost. Now, whether fixing our attention on the consequences of an act shall have any tendency to excite movements or not, and if so, what the movements shall be, depends on the state of our feelings in regard to them. The thought that if I put a paper in the fire it will be burned, or that if I throw a stone through my window it will break the glass, excites no movement, because I have no desire for either result. If a young lady has an offer of marriage, the movements which it will excite will not depend on the amount of attention she gives it, but on her disposition in regard to the person making it. That is, while in ideo-motor action the mere thought of the movement is sufficient to set off the nervous mechanism in such a way as to produce it, in such a case as this, the movements are determined, not by the thought of the words of acceptance or refusal, but by the subject's feeling in regard to the results which will follow their utterance—an essentially different state of affairs.

Professor James qualifies the statements made in the passages quoted above, as follows :

"It is unqualifiedly true that if any thought *do* fill the mind exclusively, such filling is consent. The thought, for that time, at any rate, carries the man and his will with it. But it is not true that the thought *need* to fill the mind exclusively for consent to be there ; for we often consent to things, while thinking of other things, even of hostile things ; and we saw in fact that precisely what distinguishes our 'fifth type' of decision from other types (see p. 534) is just this existence with the

triumphant thought of other thoughts which would inhibit it but for the effort which makes it prevail. . . . . So that although attention is the first and fudamental thing in volition, *express consent to the reality of the thing attended to* is often an additional and quite distinct phenomenon involved.

"The reader's own consciousness tells him, of course, just what these words of mine denote. And I freely confess that I am impotent to carry the analysis of the matter any farther, or to explain in other terms of what this consent consists. It seems a subjective experience *sui generis*, which we can designate, but not define." (P. 568.)

I have, perhaps, already said as much as is necessary in regard to the feeling of effort. We have it whenever we renounce what, at the time, we strongly desire. Professor James makes a mystery here of what seems to me a very plain and simple matter. I should use a stronger word than "consent" to express my state of mind in such a case as he is considering. So far as my consciousness informs me, when I come to a difficult decision, it is always by a choice or preference of one alternative over the other. Both may be, in themselves, undesirable; but in comparison, one must be more desirable than the other. I do not wish to lose my money, but I would rather lose my money than my life. The preference of one thing to another may be an experience *sui generis* and incapable of further analysis, but it is as intelligible as anything in the working of our minds.

In what does the "fiat," of which so much is said, consist? I presume I shall not carry the assent of all, perhaps not of many, of my readers in what I am about to say, but I am unable, in my own case, to find anything more or less in it than the combination of desire with the feeling of power that the contemplated act may take place *now*. It seems to me that the line of argument by which Professor James disposes of the feeling of innervation is equally applicable here. When we have this combination of feelings we have volition, and under no other circumstances. If we suppose the "fiat" to be something distinct, how can we distinguish it from that without which we never experience it, and which we never experience without it? We are so made that when we wish and feel able to act we act, and the insertion of any additional factor is an entire superfluity.

To recapitulate: Professor James's argument, as I understand it, is that, inasmuch as we perform a multitude of acts which are incited merely by the thought of the movement, without respect to its consequences, and when the idea of an act takes entire possession of the mind, the act is inevitably performed, it follows that attention to the act itself—that is, the bodily movements—is the only essential constituent of its voluntary nature, and that desire or aversion, in respect to its consequences, is, in this regard, only an accidental and superfluous accompaniment, which, so far as it can be considered operative at all, acts only by directing our attention.

I hold, on the other hand, that, by the well-established use of language, only those acts are termed voluntary which are performed intentionally, purposely, by preference or choice. This choice may be between two or more courses of action,

or between action and inaction, but in either case it is determined, not by the thought of the action itself, but by our desire or preference of its anticipated results. The amount of attention directed to the act itself may be reduced to a minimum without impairing its voluntary character, provided it is done with a conscious purpose.

This brings us back to the statement of the case by Professor James, with which we started out. Our choices or preferences are merely the predominances of our desires, or. what is the same thing looked at from the other side, our aversions. Desire of the result, not attention to the means of securing it, is, to my mind, the fundamental thing in voluntary action.

Professor James does not attempt any exhaustive discussion of the question of "Free Will." He considers the question insoluble on logical grounds, and after a very clear and fair statement of the scientific argument for determinism from the unity and continuity of nature, decides in favor of the hypothesis of freedom on ethical grounds, the nature of which is indicated in the following passages:

"The most that any argument can do for determinism is to make it a clear and seductive conception, which a man is foolish not to espouse, so long as he stands by the great scientific postulate that the world must be one unbroken fact, and that prediction of all things without exception must be ideally, if not actually, possible. It is a *moral* postulate about the Universe, the postulate that *what ought to be can be, and that bad acts cannot be fated, but that good ones must be possible in their place*, which would lead one to espouse the contrary view. But when scientific and moral postulates war thus with each other and objective proof is not to be had, the only course is voluntary choice, for scepticism itself, if systematic, is also voluntary choice. If, meanwhile, the will *be* undetermined, it would seem only fitting that the belief in its indetermination should be voluntarily chosen from amongst other possible beliefs" (p. 573).

"*The question of fact in the free-will controversy is thus extremely simple.* It relates solely to the amount of effort of attention or consent which we can at any time put forth. Are the duration and intensity of this effort fixed functions of the object, or are they not? Now, as I just said, it *seems* as if the effort were an independent variable, as if we might exert more or less of it in a given case. When a man has let his thoughts go for days and weeks until they culminate at last in some particularly dirty or cowardly or cruel act, it is hard to persuade him, in the midst of his remorse, that he might not have reined them in; hard to make him believe that this whole goodly universe (which his act so jars upon) required and exacted it of him at that fatal moment, and from eternity made aught else impossible. But, on the other hand, there is the certainty that all his *effortless* volitions are resultants of interests and associations, whose strength and sequence are mechanically determined by the structure of that physical mass, his brain: and the general continuity of things and the monistic conception of the world may lead one irresistibly to postulate that a little fact like effort can form no real exception to the overwhelming reign of deterministic law. Even in effortless volition we have the consciousness of the alternative being also possible. This is surely a delusion here; why is it not a delusion everywhere?" (Pp. 571–572).

If I were seeking nothing more than a dialectical victory, it would be sufficient to say that Professor James, on his own premises, concedes the whole question in the closing sentences above quoted. As we have already seen, he insists, repeatedly and emphatically, that effort of will is only put forth on the side of our ideals, against our instincts and propensities; that we never resist our energy, overcome our courage, or conquer our sobriety. If we accept this as the fact, it must, of course, follow that all our bad decisions are decisions without effort, as it certainly is the fact that most of them are, and we are thus, at one stroke, deprived of the only reason, according to our author, for questioning the doctrine of determinism.

Taking the ground that I do, that Will is nothing but the combination of feelings of desire and ability, it evidently follows that the question is merely in regard to the freedom of desire. That is, are our likings and dislikings, either absolutely or relatively to each other, under our control? Of course we are free from external coercion in such matters. No one can compel us to like the taste of castor oil better than that of honey, the odor of onions than that of violets, the braying of an ass than the touch of a master hand on the keys of the organ, but can we compel ourselves to do it? I do not of course deny that we can, by habit and association, work great changes in our tastes. The question is as to our ability to change them abruptly, by an effort of attention, or of consent, or what not. There is no doubt that it would be very convenient if we could gain such control of our feelings that the old saying might be made to read, even at the expense of rhyme, "What can't be cured must be *enjoyed*," but I presume few will maintain that their will can accomplish so much as that. Yet such is the only meaning which, to my mind, the assertion can have that we can, by such effort, give the preponderance to what is, in itself, the weaker motive. What we call motives are nothing but our likings and dislikings. It may be thought by some a confession of weakness of will, but I am unable to imagine myself voluntarily doing an act which I expected would have unpleasant consequences to myself, unless I felt, at the time, that the results of not doing it would be still more unpleasant. And, although I have abundant reason to wish for a clearer perception of what is good, I have no desire for such freedom as will enable me to choose what seems to me the worse.

This is all I have to say at present in criticism of the position of Professor James in regard to this subject. Before closing, however, I will briefly call attention to an aspect of the matter which does not seem to me to have attracted the attention it deserves.

We have seen that an essential constituent of every volition is a desire for a state of consciousness different from the present. But we cannot desire that of which we have no conception, consequently it follows that imagination must play a part in every motive to action.

Unless I am much mistaken, what we call strength of will depends very largely on imaginative power. It is not altogether easy to distinguish this quality from obstinacy—the disposition to persist in a course once undertaken, independently of its

wisdom. But when we find a man who, having once settled upon a reasonable course of action, pursues it to the end, in spite of difficulties and discouragements, it will be found, I think, that the distinguishing quality of his mind, as contrasted with the fickle and vacillating, consists in the power of realising, at all times, the remote, as well as the immediate consequences of his acts. This deters him from hastily entering on courses of action which he will not be able to carry though, and when temptations to turn aside assail him, this enables him to see that they are not worthy of attention in comparison with the motives for persistence.

We have a natural propensity to be more affected by objects that are present to our senses than by those that are absent, by what we expect to occur immediately than what is in the distant future. The child who idles away the time in which he should perform an allotted task, the savage who spends a time of plenty in sloth and gluttony, both know that the time is coming when they will have occasion to regret their negligence, but they are incapable of realising how they will feel when it comes. Many a soldier, who enlisted with a heart overflowing with valor, has felt a change which he could hardly justifiy by logic come over his estimate of the comparative value of military glory and a whole skin, when he came under fire.

Kinglake, in his "Eothen," relates that on one occasion he engaged some of the wandering Arabs of the desert, who have an invincible repugnance to cities, to transport him and his baggage to Damascus. The bargain was explicit, and they fully understood what was expected of them. As they came in sight of the city, however, they grew uneasy, and began to beg to be released from their agreement. The nearer they approached, the more their distress increased, till they finally left their camels and fled into the desert, choosing rather to lose not only their wages but their property than to enter the hated walls. He remarks that he has no doubt of their sincerity at the time the bargain was made, but believes they were incapable of imagining, what would be their feelings when they came to carry it out.

St. Paul speaks of enduring "as seeing him who is invisible." The psychology of strength of will is condensed into that sentence. The man who fully realises the unseen and remote is not at the mercy of every fresh impression on his senses. He may have little obstinacy, and be always ready to recede from an opinion or a course of action that turns out to have been ill-advised. The objects of his aspiration may be worthy or unworthy, real or illusory. But when he has counted the cost, and decided what is most to be desired, he moves on, steadfastly and unswervingly, to the consummation of his purpose. Sloth does not enchain him; passion does not seduce him; difficulty and danger do not daunt him.

"Si fractus illabatur orbis
Impavidum ferient ruinae."

W. L. WORCESTER.

BOOK REVIEWS.

A. BRONSON ALCOTT, HIS LIFE AND PHILOSOPHY. By *F. B. Sanborn and William T. Harris.* Boston: Roberts Bros. 1893.

This is one of the most noteworthy biographies of this biographical year. Mr. Alcott was a unique man, and during his long life of nearly ninety years, while always retaining his intense personality, he was yet the representative of much that was highest and holiest in thought, and noblest in action in his times.

Perhaps nowhere but in New England could the same varied influences have been found and blended into a character so unique and so harmonious in itself. The intense religious life of New England was not so much emotional as moral and philosophical. The delight in the perfect logical sequence of the "plan of salvation" developed a certain metaphysical ability even in the plainest folk. It has well been said that the Calvinist was at once an aristocrat and a democrat. He who was "elected before the foundations of the world" to the highest honors of Heaven, could not feel abased before any earthly dignity, and this gave a sense of self-respect and conscious dignity which suited with the equality of all men before the law. So that not alone from his English ancestry, but from the high thinking of his companionship, Mr. Alcott gained the fine manners which distinguished him. He resembled the Scotch pedlar who, as King James said, "could put his pedigree in his chest, when engaged in his calling, but bring it out when a higher occasion required."

Mr. Sanborn has shown the development of Mr. Alcott's thought and character as even those who have long known him hardly understood it. He passed through many phases of life and thought, and distilled from all the fine spirit of life, which, if at times a little intoxicating, had much of ripe, sweet wisdom, which he concentrated into the Orphic sayings, which remain unexhausted after many years of study.

Belonging to his age, and yet a perpetual protest against many of its tendencies, it is difficult to estimate his influence rightly, and to strike the true balance between the ardent faith of his admirers on the one hand, and, on the other, the indifference, not to say contempt, not of his enemies, for his nature was not prone to warfare, but of those who could not see the real man. But when we remember that among

those admirers were such men as Emerson, Thoreau, Channing, Hedge, Harris, and others of the highest thinkers of his day, with such women as Margaret Fuller and Elizabeth Peabody, certainly nobody can pass by this life carelessly, without seeking to understand how the pedlar-boy of Connecticut became the Philosopher of Concord.

Fortunately, Mr. Alcott believed in records of life and thought, and held his own to be of value, and hence his biographers have ample material from which to draw his protrait. It is good that his features have been painted by friendly, yet critical pens, for it is not cold dissection, but loving insight which reveals the mysteries of human life.

Born in Connecticut, in a farmer's home, but evidently inheriting the constitution and fine brains of an old English ancestry, Bronson Alcott passed his early life in the country, and then started on his career as a pedlar. But his journeyings in this humble capacity were made to minister to his mental development, for he observed men and society, he read all the books he could lay his hand on, and still more, he was thrown into temptation and learned to know his own strength and weakness. He confesses to have committed, on one of these journeys, the only serious transgression of moral law of which probably he was ever guilty in his long and innocent life. Tempted by the desire of seeing the cities and of appearing in fine clothes, for he always had a great love of handsomeness, he used the money, which should have paid for his stock, to gratify his taste, and then, repentant and ashamed, went home to grieve his mother's heart. The sense of this error remained with him for long years and may have influenced him in his working out of the problem of evil, which, Mr Harris shows. was the basis of his philosophy.

His next pursuit was that of teaching, equally characteristic of New England life, and here he found his true calling. At first, while his diaries are full of earnest thought, they do not reveal the strong peculiarities and extreme following out of new ideas which appeared later. His style of writing is clear and reasonable, and his methods of teaching appear to have met with acceptance. He had already to some extent anticipated the work of Theodore Parker in Theology, and his views of education were akin to those of Pestalozzi and Froebel, as yet unknown to him.

He believed in attraction for the child, rather than coercion, and strove to educate the whole nature, rather than merely to instruct the intellect. The influence of the "Friends," with whom he had passed some time, led him to the doctrine of the "Inner Light," which was strongly in harmony with his own nature.

As he went on developing his own plans of education, he became still more separated from the common traditions, and when he attempted to carry out his ideas fully in the Temple School in Boston, his extreme methods in discipline and instruction failed to win the approval of the parents, or to influence the children as deeply as he expected. It would be very interesting if some of his pupils, now having full experience of life, would tell us how much of value remained to them from his lessons. In addition to the peculiarities of his method, he ran counter to the despic-

able prejudices of the day, by admitting colored children to the school, and he was assailed in the newspapers with wholly unpardonable virulence. He was warmly defended by Mr. Emerson, who always believed in him, loved him, and was his good providence in every emergency.

The story of Mr. Alcott's marriage to one who comprehended his high thought and loved him devotedly through all trials, brightens the somewhat sad history of his failures; and the sonnets, written in old age, in which he recalls those days of early love, are clear and sweet as the song of the oriole amid the blossoming of May.

It was during his early married life that he seemed to lose the just estimate of practical affairs and not to hold an even balance between theory and practice. To this period belong the anecdotes of his odd sayings and doings. He afterwards could look back on these extravagances with a smile, remembering the chill of a voyage on a Hingham steamboat when he was "clothed all" in linen, because he would not deprive the sheep of their covering, and lending money to unknown people without even asking their names, his faith in its return in some cases being fully justified.

The most serious of these experiments, which came near to wrecking his sanity and life, was the attempted colony at Fruitlands, of which his gifted daughter has told the story with all possible humor and pathos in her sketch, called "Transcendental Wild Oats."

But, during all this time he was fully interested in the great moral crusade against slavery, seeing, as clearly as Garrison and Parker, that it was a burden of sin that must be cast off before the nation could be led to righteousness. He took a brave part in the efforts to redeem the victims of the Fugitive Slave Law.

He heartily accepted the movement for the intellectual advancement of women and their admission to the exercise of the right of suffrage, for his pure and spiritual nature made him understand women as fully as they believed in him. There was always a good proportion of women in his classes for conversation, and to the last, young women found in his utterances at the Concord School the same sense of a fresh, reviving spiritual atmosphere that their elders had found from his words, (and they were the same words,) thirty years before.

Beautiful is the story of the family-life, with the generous, warm-hearted mother, who always kept close to her children's hearts, and of the work of the devoted daughter, which at last brought prosperity to all the family and gave the philosopher a serene and comfortable old age.

Mr. Alcott has been called vain and egotistic, but I think he never felt a keener thrill of pride than when he was welcomed in Western schools as the "Grandfather of Little Women."

In his quiet retreat he reviewed the old traditions from which he had separated in his youth, and found meaning and sweetness in much that he had then cast aside. This broad catholicity was misunderstood, and it was often reported that he had

changed his views and joined some exclusive church. But he took no backward step! It was remarkable that with his high standard of thought, his elevation of feeling, his love for order and beauty and handsomeness, which sometimes gave a touch of high breeding, which some would call aristocratic to his manners and surroundings, he never fell into a reactionary spirit, he never lost faith in the heart of mankind. If he believed in a government of the best, he judged of the best by no conventional standards. If his heart yearned for communion with his fellows, he did not purchase the delight by any sacrifice of his own allegiance to truth. But he did love a recipient soul to whom he could express his own thought. And he gained from a sympathy, which was not always accompanied by intellectual comprehension.

The charm of his manners, the sweetness of his disposition, the tenderness of his feelings, and the warmth of his friendships are well portrayed by Mr. Sanborn, who touches his little foibles lightly, only making them serve to bring out his individuality. He also presents a great deal of collateral information about persons and contemporary events, which will have value for lovers of curiosities in literaterature, but which sometimes impedes the flow and clearness of the narrative.

To Mr. Harris was committed the task, which no other could do so well, of presenting his philosophic ideas in logical order and showing their relation to the systems of preceding thinkers.

Mr. Harris finds Mr. Alcott to be an original thinker of great power, who by his own inward perception of spiritual truths reached the same doctrines which were held by the Neo-Platonists. He was not learned by the scholastic standard, but he absorbed the thought of the writers to whom he was attracted and blended it with his own spiritual life. Mr. Harris reveals a sequence and consistency in his philosophy, which a less acute reader might not easily find.

All Mr. Alcott's theories cluster about the lapse or fall of man from a state of original purity, and he finds the meaning of human life in an effort to return to primitive holiness.

While his expression of this thought is peculiar to himself, one cannot but see how the influence of the Calvinistic theology all about him, (although his immediate connection was with the Episcopal church,) must have prepared his mind to accept this solution of the great problem of Evil.

I well remember an ardent discussion between him and William H. Channing (who was, of course, brought up under Unitarian influences, and who ardently accepted his uncle's views of the dignity of Human Nature), on the expression of Mr. Alcott that Jesus did not descend into the ordinary relations of humanity. "I "protest that there is no descent," said Mr. Channing. With the doctrine of lapse naturally belonged the assertion of pre-existence and his views of Temperament and Fate. But Alcott does not narrow his doctrine of the Lapse to a historic sin of one individual, but strives to present it as a necessary basis to creation. He regards the whole series of the lower animals as produced by nan and becoming

representatives of his good or evil desires and passions. His vegetarianism is based on his philosophy, more than on hygiene.

Mr. Harris says that at times Mr. Alcott seems to accept the theory of Evolution, but that he repudiates it as the first stage of creation and accepts it only as a moral struggle of conscious beings towards purity and a recovery of lost holiness.

In thus groping after a solution of the central question of the passage of the one into the many, he necessarily takes up many forms of thought and seems at times inconsistent, but it is noteworthy that he never becomes pessimistic in his views and never loses the wholesomeness and sweetness of feeling, which make life serene and beautiful.

The dark shadow of Calvinism is not able to shut out the light of Hope If man is fallen, his face is again set heavenward, and Eternity of Life shuts out the possibility of Eternity of Hell.

It is useless to attempt to condense Mr. Harris's exposition of Mr. Alcott's thought, for he has done his work with such thoroughness and skill, that no one interested in the subject will be content without studying his own words. Differing, as he does, from Mr. Alcott's views, he gives them their full value and shows the part which his theory has played in the development of human thought.

"The Orphic Sayings," ridiculed by many and understood by few, readily yield up their meaning to Mr. Harris's analysis, and the peculiar use of language having become familiar to us, we read them with a perception of the extent of thought comprised in these few lines, and of their relation to each other.

The careful arrangement of his scales of mental powers is shown to be strictly logical and consistent with his theory.

While Mr. Alcott's want of literary skill has often prevented him from giving adequate expression to his theory, we recognise a commanding control of language in short passages, which are pregnant with meaning, like the text of unpreached sermons. Mr. Lowell's witticism is false, as satire usually is, when he says:

"A lamb among men,
"He goes to sure death when he goes to his pen."

This whole work is an extremely valuable representation of that important phase of the spiritual life of New England called Transcendentalism. Mr. Alcott may never be the teacher of the many directly, but he will be the source from which a few will draw wisdom which will pass into the common life. However succeeding times may regard him, he has had a powerful influence on many of the best minds of two generations.

Mr. Alcott himself would not be indifferent to the fact that the book is a handsome set of two volumes, well printed, with good reproductions of two different portraits of the philosopher, and a view of the Concord School of Philosophy.

* * *

Since writing the above, the last of Mr. Alcott's immediate family has passed away. Mrs. Anna B. Pratt, the oldest and last of his daughters, had just returned

to Concord to make her home there for the rest of her days. She was soon after laid in Sleepy Hollow beside her parents and sisters.

She was the Meg of the famous "Little Women" and possessed in reality all those amiable and excellent qualities which are there attributed to her. Calm in temper, retiring in disposition, affectionate and sweet in character, she resembled her father more than the other children. Justice has hardly been done to her intellectual abilities, which were thrown in the shade by the brilliant achievements of her sister. But she possessed the same vivid dramatic talent, and was a charming story teller, and sometimes her stories were mistaken for her sister's. She had not the ambition and intense energy which Louisa possessed, or circumstances did not bring them out. Marrying early—she was protected for a time from the terrible pressure of need which weighed upon the family, and when left a widow her heart and mind were engrossed with the care and education of her children.

The sad infirmity of deafness prevented her from enjoying fully the social life for which she was otherwise fitted. But she has left behind her a fragrant memory of loving affection and kind deeds in the hearts of all who knew her, and who will always remember her as one of that unique family who have done so much to bless our New England homes, and hold them to "Plain living and high thinking."

Two sons survive her, who are both connected with the enterprising firm of Roberts Brothers, to whom the public are indebted for recognising the worth of Louisa Alcott's work, and publishing it in fitting form. E. D. C.

LA RECHERCHE DE L'UNITÉ. By *E. de Roberty*. Paris: Felix Alcan. 1893.

M. Roberty's "Recherche de l'Unité" is a strange and baffling book which few readers will have the patience to appreciate at its true value. The essay is essentially a critique of the abuse of scholastic abstractions in contemporary philosophising. But the protest against abstractions is couched in so severely abstract a style that it is difficult to seize the author's thought and still more difficult to restate it fairly in simpler and more concrete language.

Rational or experimental monism is the label which M. Roberty affixes to his own doctrine. He opposes it, first, to all forms of confessed dualism, and, second, to the latent dualism which he finds lurking in neo-Kantianism, in Spencer's transfigured realism and in other contemporary forms of transcendental monism.

In his plea for monism he is traversing familiar ground and offers the reader little that is positively new. The monistic thesis can never be proved in the strict sense of the word. The dualist may always affirm, if he will, that for him the universe of experience is a product of two or more ultimate and irreducible factors that have no common divisor. And this view has been maintained by many great thinkers as the only doctrine which affords satisfaction to certain imperious demands of the human heart. However that may be, there are certain equally imperious instincts of the analytic intelligence which it leaves unsatisfied. "La raison sans cesse raisonne," and refuses to pause at any arbitrary barrier. The philosophising

intellect chafes at limits even though they be set far beyond the bonds of any probable advance of the science of our day. Where science proves unable to exhibit the unity, that is the causal interrelations, of two sets of phenomena, the philosopher postulates this unity by subsuming them both under a common logical category. And this postulated logical unity he submits to the investigator as a problem to be worked out in the symbols of mathematical physics. Nothing less than the subsumption of all experience under a single unifying category will satisfy him. And this instinct dualism baffles and disappoints. So that to this type of mind dualism presents itself not as one erroneous system of philosophy, but as an utter negation of all philosophy.

I do not know whether M. Roberty would formally assent to this statement of the monistic position, but he seems to say very much the same thing himself in his final résumé: "The rational monism of science and philosophy thus presents itself "as a psychical or even psycho-physical necessity, an imperious want which our "faculties are impelled to appease precisely because they feel themselves lost in the "chaos of our sensations at first and afterwards of our knowledge. We are unceas- "ingly preoccupied by the desire to arrest or dominate the dispersion of our intelli- "gence in the surrounding medium. This end is subserved by the ideal integra- "tion," etc., etc., p. 205.

The reader will find more that is new in the author's polemic against the latent dualism of what he calls transcendental monism. Under this name M. Roberty comprehends all systems which assume an antithesis between phenomena as a whole and a dark background or source of phenomena, variously denominated as the noumenon, the thing in itself, or the Unknowable. His argument is in substance a restatement of the familiar dilemma, as old as Plato. If it is really unknowable how can one even speak of it without self-contradiction? But in his ingenious development of this argument, M. Roberty brings into due prominence and provides with a convenient technical name a valuable logical truth,—his so-called law of the "identity of hyperabstract contraries." The name suggests unfortunate associations. But M. Roberty's law has nothing but the name in common with its Hegelian namesake. The Hegelian identity of contraries is in the main a barefaced logical equivocation arising out of the elementary psychological fact of the tendency of our minds to associate opposites. But the law here considered applies only to the widest and hence emptiest abstractions, the *summa genera* of abstraction and generalisation. As we proceed upward by successive inclusions from the lowest species to the highest genus, we assume at each stage in the process a negative idea corresponding to each positive class-notion. The ideas "not-man" and "not-animal" have as real if not, as expressly defined, a content as the positive ideas man and animal. This is as old as Plato. But our author points out further that when proceeding upward along any line of generalisation the mind attains to the highest conceivable abstraction (the term of maximum extension and minimum intension) then this formal antithesis of positive and negative loses all its real content. The nega-

tive term answering to such a *summum genus* is a mere *flatus vocis* devoid of all real significance. Plato long ago showed this in the case of the idea of absolute not-being which he dismisses in the Sophist as a futile and self-contradictory expression. But M Roberty affirms that any abstract term which symbolises the totality of experience or phenomena is identical with any other abstraction that has the same extension even though the one may be in form the contradictory opposite of the other. Thus the ideas of matter and of space void of matter are *summa genera*, in terms of either of which the relations of all phenomena may be stated. The difference is merely in the point of view as appears from the Cartesian identification of matter with extension We fall into illusion if we posit both concepts as coexisting realities and so double the phenomena And the same holds true of the correlated concepts mind and matter and subject and object Hence arises the *summa delusio*, as our author calls it of the three representative schools of contemporary thought, the Kantian criticism the agnostic positivism and the Spencerian evolutionism Differing superficially they are one in this fundamental error, that they set up as a real antithesis the purely verbal opposition between the world and its cause or ground, between phenomena and that which manifests itself in phenomena between the knowable and the unknowable These terms are all ultimate, universal, all-embracing abstractions and therefore exactly identical in respect of their real content. The world and its cause are the same indefinite totality of experiences viewed from different angles of observation The *natura naturata* to borrow Spinoza's phrase, and the *natura naturans* are not numerically distinct The noumenon is merely the phenomenon thought of in a different way. The sum total of now unknowable things is identical with the sum of things potentially knowable. "*Summa tamen omnia constant.*" We add nothing to reality by erecting altars to our own personified ignorance.

Such in substance is M. Roberty's argument, and I have nothing to object to it here. I can only wonder at the significance he attributes to the entire question. His doctrine, though he may repudiate the label, is essentially pure phenomenalism or positivism. His monism is less a positive conception than a negation of the dualism that would seem to oppose arbitrary barriers to human inquiry. His position is really that of the sceptic who through metaphysic has become dead to metaphysic. By the whole tenor of his psychology he is bound to regard abstractions as merely so many counters for the more convenient reckoning of the concrete values of life. Why should he attach so much importance to right or wrong manipulation of those counters on the metaphysical chess-board in matters which at present do not touch those realities very nearly? Like George Henry Lewes, he began with the credo of positivism. And, as happened with Lewes, his maturer thought is impatient of the seeming implication in all the divers forms of positivist agnosticism of an unknowable absolute beyond the knowable relative. The hint of a mystery, the dogmatic affirmation of a limit to human knowledge irritates and is distasteful to him. And I grant him that the doctrine, whether in its Spencerian or Kantian form

is as self-contradictory as the old neo-Platonist Damascius found it 1400 years ago. But what difference does it make to a philosopher who has transcended it? Is the religion of the Unknowable a serious danger to the moral life of modern man? Is the slight survival of this mysticism in the philosophies of a Wundt, a Spencer, or a Riehl a hindrance to concrete scientific progress? Many of the most vigorous leaders of modern thought answer these questions in the affirmative, and they may be right, *que scais-je*?

In thus endeavoring to expound the author's central thought, I have been forced to pass by the many interesting psychological *aperçus* which his book contains.

Especially noteworthy is the suggestion that the images or mental representations which the traditional psychology places between sensations and concepts arise frequently, if not normally, from a fusion of several elementary concepts and are not to be thought of always as direct copies of sensation. It was doubtless a feeling of this that led Plato in the Philebus to describe the imagination under the figure of an artist who paints the ideas which first arise in our minds as discourses of reason (λόγοι). PAUL SHOREY.

THE SCIENCE OF MECHANICS. By *Dr. Ernst Mach*, Professor of Physics in the University of Prague. Translated from the Second German Edition by *Thomas J. McCormack*. Chicago: The Open Court Publishing Company. 1893. Pages, 534. Price, $2.50.

"The present volume is not a treatise upon the application of the principles of "mechanics. Its aim is to clear up ideas, expose the real significance of the mat- "ter, and get rid of metaphysical obscurities. The little mathematics it contains "is merely secondary to this purpose."

These are the opening words of the Preface of this work, which is essentially a treatise on the *evolution* of mechanics, and not a text-book of its principles, all the problems that have arisen in the science's development being dealt with historically and from the point of view of the theory of knowledge. In this sense it is as much a contribution to philosophy as to science, and will thus be of much more value to the student and inquirer than a simple statement of technical principles could be. In Professor Mach's analysis the reader sees how the principles of mechanics have in fact been *ascertained*, from what sources they take their origin, and what their *positive* and *physical* essence is, as distinguished from the technical guise they have historically assumed and which students now so often regard as their real substance.

The gist and kernel of mechanical ideas has, in almost every case, grown up in the investigation of very simple and special cases of mechanical processes. It is these cases with which Professor Mach deals. Here we see the science in its genesis, and feel the steps by which it has been created. We accompany the great investigators in their deepest quests, meet the same obstacles, and experience the same doubts as they; learning that they, too, were mortal men, who had to hew their

way through the same difficulties as we, in the solution of our problems In this way, we follow the trains of thought of Archimedes, Stevinus, Galileo, Huygens, Newton, and Lagrange, and participate in the making of their great discoveries. Thus, we live over in our souls their intellectual lives.

The confidence and strength which we gain for our own labors in such work cannot be overestimated. No one can come away from the perusal of this book without being intellectually and spiritually bettered, or without having won a taste for employment with high thought and classical knowledge which will always profit him.

The parts of the work of greatest import to those interested in physics are, the sections on the development of statics and dynamics, the discussions of the foundations of dynamics, the criticism of Newton's views, the substitution of newly formulated and more logical principles for the Newtonian axioms and definitions, and the chapter on the "Formal Development of Mechanics." To the philosopher all is of equal interest, as he may here see the way in which a complete and perfected science has actually been developed, and thus have the opportunity, in constructing his theory of knowledge of adhering to facts.

The general reader's interest will probably be fastened with the two sections in Chapter V: "Theological, Animistic, and Mystical Points of View in Mechanics," and "The Economy of Science." In the first we read of the religious opinions of the great inquirers, of their struggles with their inborn theological ideas, (or rather of the struggles of these ideas with new and irreconcilable opponent-ideas,) and of the way in which science has always been tinged with religious, spiritualistic, and mythological conceptions.

In the section on "The Economy of Science" is contained, in succinctest form, the groundwork of Professor Mach's philosophy. In his view, all science is economy of thought. Economy of thought—the saving of mental time and labor—is the object of language, arithmetic, algebra, of all concepts, and of science generally. All this is illustrated by a brief discussion of arithmetical and algebraical rules, the theory of determinants, calculating machines, the laws of physics, and space of many dimensions. By the light of this theory the reader will understand many problems of abstract physics which were before obscure to him.

No pains have been spared in the mechanical execution of the work, or in insuring correctness of translation. The proofs of the translation were read by Professor Mach himself, and also by Mr. C. S. Peirce, who edited the division "Mechanics" in the *Century Dictionary*. Mr. Peirce has also independently supplied a few paragraphs on the measures and weights of this country and Great Britain. The book is exhaustively indexed, and at the sides of the pages marginal analyses of the paragraphs are printed. Of the two hundred and fifty cuts and illustrations which the work contains, all have been redrawn with the exception of the fac-similes of old originals, of which there are a number. AA.

LEITFADEN DER PHYSIOLOGISCHEN PSYCHOLOGIE IN FÜNFZEHN VORLESUNGEN. By *Prof. Dr. Th. Ziehen.* Jena: Gustav Fischer. 1893.

The second edition of Professor Ziehen's *Leitfaden* contains some additions and emendations, and, we are glad to say, an index; but, upon the whole, the text has remained unaltered. We have reviewed this book in a former issue of *The Monist*, Vol. II, No. 3, page 461. Ziehen is an antagonist of Wundt's, but it is to be regretted that his criticisms are based upon a misconception of Wundt's theory of apperception. κρς.

LOGIK. Eine Untersuchung der Principien der Erkenntniss und der Methoden wissenschaftlicher Forschung. By *Wilhelm Wundt.* Erster Band. Erkentnisslehre. Zweite umgearbeitete Auflage. Stuttgart: Ferdinand Enke. 1893.

The first edition of this work of the well-known Leipsic professor appeared in 1883 in two volumes, entitled, respectively, *Erkenntnisslehre* and *Methodenlehre*. Of the present edition only this, the first volume, has as yet appeared. The volume is a large one, containing six hundred and fifty-one pages; its great size being due to the fact that Professor Wundt has a very comprehensive conception of logic—one coextensive, almost, with the entire field of general philosophy. We shall review this work exhaustively in a later number and will only mention here that Professor Wundt's point of view is not that of the traditional school, but, in contradistinction to the Aristotelian methods, professes to supply rules for the conduct of real research and means for the acquisition of new truth. μκρκ.

LA VUE PLASTIQUE FONCTION DE L'ÉCORCE CÉRÉBRALE. Par *Georges Hirth.* Traduit de l'allemand par *Lucien Arréat.* Paris: Felix Alcan. 1893.

A review of the predecessor of this work, *La physiologie de l'art*, appeared in Volume III, No. 1, page 143, of *The Monist*, to which we must refer the reader for the foundations of the theory of the present work. Its translator is M. Lucien Arréat, the accomplished correspondent of *The Monist*, who has performed his task with correctness and felicity.

It is a well-known fact that our judgment of the extension, and especially of the depth, of bodies is an interpretation of planar figures. We do not see things stereometrically; that is, we do not see solid objects as solid; but we see "plastically"; that is, we see things by means of fictitious or shapen images of them.

This problem of plastic vision has occupied investigators from the very beginning of science, and countless theories have been set up to explain it. The most recent ones are, that which regards the connexion of impressions with exterior objects as the effect of our innate concept of causality (Schopenhauer); that of projection (the mathematico-optical theory); that by which plastic vision is explained as due to the collateral confirmation of the other senses; that which, like the former, claims that the corporeality of things is the product of constructive imagina-

tion ; and, finally, that which defines sensory experience in this respect as a motor memory, making our faculty of measuring with the eyes the result of innumerable movements of the eye, which movements have gradually endowed the organism with such a delicate sense of muscular innervation, that even without executing these movements we obtain, by simple presentiment, images more or less distinct of depth, and so forth.

As opposed to all these various hypotheses, the theory of the author is, that plastic vision is a function of the cerebral cortex. And, in contrast also to the former methods, which were chiefly mathematical and metaphysical, his is physiological.

In a sense, his results are a modification of the nativistic theory. In the *original* formation of the faculty of plastic vision, indeed, the effect of experience is not denied, but this influence, it is contended, is one which must be sought rather in the primitive experience of the race than in the individual.

Plastic luminous sensations, he claims, cannot by any possibility be effected without an innate nervous organisation adapted to such production. Plastic vision, in one of its aspects, is a cerebral necessity ; it is not effected directly by the real figures of objects, or by their actual position in space, or by their binocular projection and perspective on the retina, but by the independent action of central luminous excitations, which owe their origin to certain properties of the surfaces of bodies, and which constitute, thus, a central constraint. The result of this is, (as is also the fact,) that we are subject to *necessary* plastic representations, even when experience tells us that we have not before us bodies possessed of actual properties of relief, as in the stereoscope, and so forth. Our organ is thus *constrained* to acquiesce in many illusions concerning the corporeality of nature.

Plastic vision, in fine, is not a linear-perspective vision endowed with stereometric projections ; it does not measure angles or parallaxes ; but simply has *sensations* more or less strong for the qualities of remoteness and for the relative extent of lights projected from the two retinas into the visual spheres and there fused.

Lights, which are both correspondent by their position on the two retinas and homologous with respect to energy of specific color, fuse in the elements of perception of the visual spheres, not by reason of a common fixation or the intuitive activities of the understanding, but in virtue of a dynamical constraint. Binocular fixation, clear vision, the convergence of the eyes, and so forth, are simply concomitant phenomena and more or less indispensable means of this "confluence"; they are not its original cause.

The central constraint which is due to this "confluence" of homologous lights explains many of the mooted points of vision. All phenomena accompanied by adaptation of the visual organ, claims the author, are explainable from our simple feelings of the qualities of remoteness of light, which alone is sufficient to set in motion the mechanism of adaptation.

Plastic vision, in its origin, before the influence of collateral memory-images

and their associations, is the simple evolutionary product of luminous excitations, which contain *implicite*, the elements for the judgment of distance; as a developed faculty, it is a central innervation, the active expression of our feeling for the qualities of remoteness of light. This is the core of the theory. *μκρκ.*

UEBER HYPNOTISCHE EXPERIMENTE. By *Professor R. von Krafft-Ebing.* Stuttgart: Ferdinand Enke. 1893.

NATURGESCHICHTE DES VERBRECHERS. By *H. Kurella.* Stuttgart: Ferdinand Enke. 1893.

DAS GEFÜHL. EINE PSYCHOLOGISCHE UNTERSUCHUNG. By *Prof. Theobald Ziegler.* Stuttgart: Göschen. 1893.

The putative discovery of Krafft-Ebing that persons exist who by hypnotism can be put back into early periods of their life, so that, for example, a person thirty years old may be suddenly made to feel and to conduct himself as he did in his seventh year, is one fraught with great consequences, and has been much discussed of late in the press of Germany. As was to be expected, it met with much critical opposition, and among its foremost assailants, of scientific reputation, were Professors Ganster and Benedikt, the Vienna colleagues of Professor Krafft-Ebing. Benedikt went so far as to pronounce the whole matter a stupid humbug, and declared that Krafft-Ebing had been made the victim of his own credulity and been basely imposed upon by a designing hysterical person. It was to be expected that the celebrated Vienna psychiatrist, who thus saw his reputation endangered, would soon put forth an answer to these attacks, and the present tract is the result. It bears the motto, "Unlimited doubt as much the offspring of mental impotence as unlimited credulity," and contains in addition to its accurate presentation of the subject under discussion a sharp criticism of the strictures of his opponents, and especially of the animadversions of Benedikt. In keen psychological analysis it surpasses other books of its class, and may be cordially recommended to the readers of *The Monist* —a recommendation which the high reputation of its author almost makes superfluous.

* * *

The second of the books listed at the head of this review is by H. Kurella, the author of the pamphlet on Lombroso, mentioned at page 640 of the last *Monist*. The present work of Kurella is quite extensive and supplies all the data necessary for a general study of the modern doctrines of criminology. It is an elaboration of all the previous literature of this subject, together with the author's original researches. After an introduction, Kurella treats of the abnormal anatomical features of the criminal, the biology and biological factors of the criminal, the psychology of the criminal, and finally of theories and applications.

In the chapter on the psychology of the criminal Kurella first portrays for us symptomatically the features of the criminal mind as this latter has been observed

by Lombroso and his school, and then proceeds to his elucidation, the chief result of which is the opinion that the main defect of the habitual criminal is his lack of moral sense. Of course, this is not a very remarkable conclusion, for what is in real need of explanation is the foundation and origin of this lack of ethical sense. Lombroso, following the precedent of Prichard, assumes in the normal man a moral faculty, an organ, as it were, of morality, which in the criminal is supposed to be wanting. This theory is, of course, untenable, for many reasons; and is also rejected by Kurella, without his substituting, however, any competent explanation in its place. Kurella seeks the key to the mysteries of criminal psychology in the study of the emotions, which in its present imperfect form is, nevertheless, not quite capable of supplying an explanation of criminal traits. In Kurella's opinion, the doctrine of emotions in recent years has been unduly forced into the background. He remarks in this connexion: "Unfortunately, it cannot be said that "the theory of the emotions and of the pathological phenomena of the emotional "sphere stands in the foreground of modern research. The analysis of the sensa- "tions and of perceptive images and movements dominates so completely the ener- "gies of modern psychology, and the localisation studies of cerebral pathology so "completely absorb the interests of psychiatry, that the emotions are hardly treated "at all, and investigators are even inclined to smother the voices of these trouble- "some disturbers of the nicely ordered relations of localised ideas."

So far as we can see, the complaint of Kurella is justified, although very recently a work has appeared in France which, despite its many failings in psychological respects, will contribute much to the advancement of the theory of emotions, —namely Féré's *Pathology of the Emotions*. The reason the investigation of the nature of the emotions especially, and, we may add, of affective life generally, has been so neglected in our day is to be sought in the preponderantly experimental character which psychology has recently taken on, and which is not adapted to the conquest of this domain. But it is also to be sought, as Professor Theobald Ziegler remarks, (in the third book mentioned at the head of this review,) in the *philosophical* tendency of the present day.

With Kant, the interest of reason is predominant; in the veins of the cognising subject, as he constructed it, says Dilthey, not real blood, but the impoverished fluid of reason, as pure intellectual activity, courses. The panlogism of Hegel, despite its fine sense for religious and æsthetic questions, was never quite able to do full justice to the emotional side of psychic life. The philosophy of Herbart, on the other hand, whose chief forte was psychology, also was unable, with its mechanism of representation in which it dissolved all mental life, to supply a competent explanation of the emotions; despite the valuable treatises of Robert Zimmermann and Joseph von Nahlowsky. In Schopenhauer's metaphysics of the will, emotional life met with scarcely any treatment, despite the strongly emotional background of this philosopher's pessimism. And in the case of Wundt it is to be seen how, owing to the influence of a metaphysical doctrine of the will, precisely the

emotions were curtailed in treatment, although here there was present the counterpoise of keen and careful psychological presentation.

We cannot, however, ascribe to Ziegler's book a place among the more important works on this subject. In point of fact, it is not the author's intention to offer anything new, but rather to give a summary of the old, and contrast it with modern tendencies of research. It cannot be said that this has been well done, though the book possesses withal a high value in the general survey which it gives of the subject. It might have been made more useful by greater uniformity of treatment; the author alternately talking in a popular and rigorously scientific tone, and indulging in many digressions.

Very exact knowledge of the nature of the emotions will exert a great influence on pedagogy, especially on that branch of it which takes up with the results of psychology; and wherever pathological phenomena in this field are treated, pedagogic pathology may hope to derive advantage from it. In this connexion it will not be out of place to refer to two tracts recently published by W. Bertelsmann of Gütersloh—one by W. Trüper, of Jena, on the pedagogical application of Koch's doctrine of the psychopathical minor factors, entitled *Ueber die Erziehung psychopathischer Minderwerthigkeiten*; and the other by G. Közle, entitled *Die pädagogische Pathologie im neunzehnten Jahrhundert*, which is a synopsis of all that has appeared in Germany on pedagogical pathology since the beginning of the century, though not including the medical side of the science. C. U.

We have received from M. George Mouret a reply to the criticisms of Mr. F. C. Russell, published in Vol. III, No. 2, of *The Monist* in the article "Logic as Relation Lore." To our regret, M. Mouret's article has been crowded out of the present number of *The Monist*, but will be published in a subsequent one. We also wish to state that the author of the article "Meaning and Metaphor" in the last number of *The Monist* is "The Hon. Lady Welby," not "Lady Victoria Welby."

PERIODICALS.

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. Vol. V. Nos. 5.

ZUR THEORIE DER CEREBRALEN SCHREIB- UND LESESTÖRUNGEN. By *R. Sommer.*—DIE GÜLTIGKEIT DES NEWTONSCHEN FARBENMISCHUNGSGESETZES BEI DEM SOG. GRÜNBLINDEN FARBENSYSTEM. By *Eugen Brodhun.*—LITTERATURBERICHT. (Hamburg and Leipsic: Leopold Voss..)

VIERTELJAHRSSCHRIFT FÜR WISSENSCHAFTLICHE PHILOSOPHIE. Vol. XVII. No. 3.

DIE PHILOSOPHISCHE BEDEUTUNG DER ETHNOLOGIE. By *Th. Achelis.*—DER BLINDE UND DIE KUNST. By *Fr. Hitschmann.*—WERTHTHEORIE UND ETHIK. By *Chr. Ehrenfels.*—DIE BESTÄTIGUNG DES NAIVEN REALISMUS. Offener Brief an Herrn Prof. Dr. Richard Avenarius. By *W. Schuppe.* (Leipsic: O. R. Reisland.)

THE AMERICAN JOURNAL OF PSYCHOLOGY. Vol. VI. No. 1.

SYLLABUS OF LECTURES ON THE PSYCHOLOGY OF PAIN AND PLEASURE. By *Benjamin Ives Gilman.*—THE NEW LIFE: A STUDY OF REGENERATION. By *Arthur H. Daniels, B D.*—PSYCHOLOGICAL LITERATURE. (Worcester, Mass.: J. H. Orpha.)

THE PHILOSOPHICAL REVIEW. Vol. II. Nos. 4 and 5

INTERNAL SPEECH AND SONG. By *Prof. J. Mark Baldwin.*—THE MEANING OF TRUTH AND ERROR. By *Dickinson S. Miller.*—GERMAN KANTIAN BIBLIOGRAPHY. By *Dr. Erich Adickes.*—DISCUSSIONS: MODERN PSYCHOLOGY. By *Prof. E. B. Titchener.*

METAPHYSIC AND PSYCHOLOGY. By *Prof. John Watson.*—THE ETHICAL IMPLICATIONS OF DETERMINISM. By *Dr. Eliza Ritchie.*—THE TRUTH OF EMPIRICISM. By *Prof. James Seth.*—GERMAN KANTIAN BIBLIOGRAPHY. By *Dr. Erich Adickes.*—BOOK REVIEWS. (Boston, New York, Chicago: Ginn & Co.)

PHILOSOPHISCHE MONATSHEFTE. Vol. XXIX. Nos. 5 and 6.

DIE RELIGION DER WISSENSCHAFT. Eine Skizze aus dem philosophischen Leben Nordamerikas. By *Paul Carus.*—EIN UNAUFGEKLÄRTES MOMENT IN DER KANTISCHEN PHILOSOPHIE. By *Robert Hoar.*—WERKE ZUR PHILOSOPHIE DER GESCHICHTE UND DES SOCIALEN LEBENS. (Vierter Artikel: *Gabriel Tarde,* Les lois de l'imitation.) By *F. Tönnies.*—LITTERATURBERICHT. (Berlin: Dr. R. Salinger.)

ZEITSCHRIFT FÜR PHILOSOPHIE UND PHILOSOPHISCHE KRITIK. Vol. CII. Nos. 1 and 2.

ERNST PLATNER'S UND KANT'S ERKENNTNISSTHEORIE MIT BESONDERER BERÜCKSICHTIGUNG VON TETENS UND ÆNESIDEMUS. (Concluded.) By *Dr. Arthur Wreschner.*—PSYCHOLOGISCHE STREITFRAGEN. III. Paul Natorp's Einleitung in die Psychologie. By *Johannes Volkelt.*—ZU KANT'S LEHRE VOM DING AN SICH. I. By *Ludwig Busse.*—RUDOLF SEYDEL.

ZU KANT'S LEHRE VOM DING AN SICH. II. By *Ludwig Busse.*—SALOMON MAIMONS VERSUCH ÜBER DIE TRANSCENDENTALPHILOSOPHIE IN SEINEM VERHÄLTNIS ZU KANT'S TRANSCENDENTALER ÆSTHETIK UND ANALYTIK. By *Ludwig Rosenthal.*—GEISTIGE UND MATERIELLE KRAFT. By *Dr. Eugen Dreher.*—RECENSIONEN. (Leipsic: C. E. M. Pfeffer.)

MIND. NEW SERIES, No. 7.

IDEALISM AND EPISTEMOLOGY. By *Prof. Jones.*—ARISTOTLE'S THEORY OF REASON. By *F. Granger.*—METHODS OF INDUCTIVE INQUIRY. By *Henry Laurie.*—ON THE DISTINCTION BETWEEN REAL AND VERBAL PROPOSITIONS. By *E. T. Dixon.*—ASSIMILATION AND ASSOCIATION. (I) By *Dr. James Ward.*—DISCUSSIONS, ETC. (London and Edinburgh: Williams & Norgate.)

INTERNATIONAL JOURNAL OF ETHICS. Vol. III. No. 4.

ON CERTAIN PSYCHOLOGICAL ASPECTS OF MORAL TRAINING. By *Josiah Royce.*—THE PLACE OF INDUSTRY IN THE SOCIAL ORGANISM. By *William Smart.*—ON HUMAN MARRIAGE. By *C. N. Starcke.*—CHARACTER AND CONDUCT. By *S. Alexander.*—MORAL DEFICIENCIES AS DETERMINING INTELLECTUAL FUNCTIONS. By *Georg Simmel.*—DISCUSSIONS.—BOOK REVIEWS. (Philadelphia: International Journal of Ethics, 118 S. Twelfth Street.)

THE NEW WORLD. Vol. II, No. 7.

ERNEST RENAN. By *James Darmesteter.*—A WAY OUT OF THE TRINITARIAN CONTROVERSY. By *James M. Whiton.*—THE RELATIONS OF RELIGION AND MORALITY. By *Wilhelm Bender.*—THE BOSTON PULPIT: CHANNING, TAYLOR, EMERSON, BROOKS. By *C. A. Bartol.*—JESUS'S SELF-DESIGNATION IN THE SYNOPTIC GOSPELS. By *Orello Cone.*—THE RÔLE OF THE DEMON IN THE ANCIENT COPTIC RELIGION. By *E. Amelineau.*—THE NEW UNITARIANISM. By *Edward H. Hall.*—BOOK REVIEWS. (Boston: Houghton, Mifflin & Co.)

REVUE PHILOSOPHIQUE. Vol. XVIII. Nos. 8 and 9.

LE RIRE ET LA LIBERTÉ. By *A. Penjon.*—LE PROBLÈME DE L'INFINI. I. LA RELATIVITÉ. (Concluded.) By *G. Mouret.*—JUGEMENT ET RESSEMBLANCE. (Concluded.) By *V. Egger.*—ANALYSES ET COMPTES RENDUS.

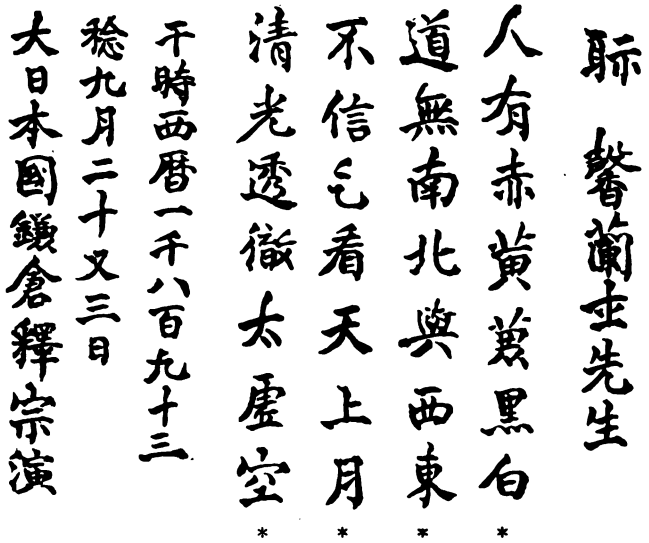
LA SENSATION DE PLAISIR. By *Bourdon.*—THÉORIE VIBRATOIRE ET LOIS ORGANIQUES DE LA SENSIBILITÉ. By *Dr. Pioger.*—LA RÉPÉTITION ET LE TEMPS. By *L. Weber.* (Paris: Félix Alcan.)

VOL. IV. JANUARY, 1894. NO. 2.

THE MONIST.

THE UNIVERSALITY OF TRUTH.

WE present to our readers the following poetical contribution from the Right Reverend Shaku Soyen, who holds the highest ecclesiastical position of the Zen sect, one of the most prominent Buddhist churches of Japan:



The poem is written in Chinese, according to the literary custom of Japanese scholars. Metrically considered it consists of four lines, each containing seven words, to be read from the top downwards, beginning at the right. The second and fourth lines rhyme.

The lines marked with stars are the poem proper; the characters at the right are the dedication, containing a transcription of the name of the Editor of this magazine, while the three lines at the left read:

"In ‖ time ‖ (of) Western ‖ calendar, ‖ the one ‖ thousand ‖ eight ‖ hundred ‖ nine-‖ -ty ‖ third (first line) ‖ year; ‖ the ninth ‖ month ‖ (on the) twen-‖ -ty ‖ and third ‖ day, (second line); Great ‖ Ja-‖ -pan ‖ country,* ‖ Kama-‖ Kura, ‖ Shaku ‖ So-‖ -yen (third line).

The translation is as follows:

"Men ‖ are ‖ red ‖ yellow ‖ also ‖ black ‖ (and) white.
But the path (of righteousness) ‖ (has) not ‖ south ‖ north ‖ west ‖ (or) east.
(If any one) does not ‖ believe (this) ‖ (let him) look ‖ (in the) heavens ‖ above ‖ (at the) moon.
(Her) clear ‖ light ‖ fills entirely ‖ (and) penetrates ‖ (the) grand ‖ vault ‖ (of the) firmament.

When recited the poem is read in a language which is a mixture of Chinese and Japanese, the delivery being made in a singing tone with long-drawn accents and vibratory modulations.†

EDITOR.

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*The expression, "Great Japan country," must not be taken as self-praise. It is the official title of the country, used exactly as is the phrase "Great Britain."

† The Chinese script, as is well known, expresses only one idea by one sign; there are no endings, no conjugations or declensions, and all words are monosyllables. The pronunciation is different in different provinces, but it is possible to study Chinese literature without knowing any one of the various dialects.

The Japanese have adopted to a great extent the Chinese script, although their language differs from the Chinese. The Japanese possesses inflexions as do the European languages. Thus not only does it take a scholar to write such poetry as here presented, but also considerable skill is required to read the verses.

The words of the translation are so divided by parallels that those interested in the script will easily be able to make out the characters. They will find, for instance, the same word "West" in line 6 from the right, place 3 from above, and in line 3 (viz., the second one of the poem) place 6 from above. The character "grand" shows a slight modification of "great." If the sign "above" (which appears in line 4, place 6) were inverted, it would mean "below." The Chinese system of writing numbers is still very primitive. A careful reader will notice that in the last line of the poem "fills entirely" and "penetrates" are two words expressing the same idea. This is frequently done in Chinese, as a matter of form whenever the pronunciation is equivocal. It would be the same in English if we added to a word, the pronunciation of which has different meanings, some of its synonyms, for instance, to distinguish "knight" from "night" by adding "chevalier," or to distinguish "rite" from "right" by adding "ceremony."

THE FUNDAMENTAL TEACHINGS OF BUDDHISM.*

OUR Lord, the Buddha, was born in the twenty-sixth year of the reign of King Shan of the Chow dynasty of China, and entered the state of Nirvana in the fifty-third year of the reign of King Boku, of the same dynasty. He appeared in the world to open in men the wisdom and perception of Buddahood. And as the dispositions of men are various, so His teachings are various; such as, lesser and greater, partial and complete, temporal and eternal.

The Lord Buddha had no greater object in view than to bring before men the highest teaching, which is that of the sure and speedy means of the One Vehicle of salvation, and to cause them to see and to enter into His wisdom and perception. Thus it came to pass, that in the third week of His own enlightenment, He preached the Avatamsaka Sutra, which is the chief wheel of His law, and to which His other teachings point.

In one scripture He says: "How wondrous! All men can have the wisdom and virtues of Tathagata." And in another He says: "When a Bodhisatva † attains to enlightenment, and sees the true

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*Translated by K. Ohara and revised by Philangi Dasa. The author, the Rev. Mr. Ashitsu, of Hieisan, Omi, Japan, a priest of the Tendai sect, attended the Parliament of Religions at Chicago during the World's Fair. He returned to Japan shortly afterwards, leaving the manuscript of this article in our possession. We have deemed it best to preserve the translator's spelling of names and to tamper with the text as little as possible. We have omitted only two or three unimportant lines which were unintelligible or at least doubtful, and added a few footnotes which are intended for those not familiar with Buddhistic terms.—EDITOR.

† Bodhisatva is one who will soon become a Buddha.—ED.

state of all things, He finds that even herbs, trees, lands, and the earth itself, have attained to the state of Buddahood."

The Buddha opened the Avatamsaka Sutra, which is the doctrine of the sure and speedy means by which all men may attain to Tathagata's wisdom and virtues, which are latent in themselves. But this deep doctrine was understood only by the Bodhisatvas of the highest degree: the rest of the Buddhist Brotherhood (Sravakas* and Pacceka-Buddhas†) did not, any more than deaf-mutes, understand it. Hence He turned the Wheel of the Law of the Four Noble Truths‡ (which contain elementary teachings), of the Twelve Chains of Causation§, and of the Six Perfections.‖ And these constitute the Three Vehicles, or means of salvation. But they are imperfect, and their aims and works slight, when compared with the One Vehicle. Hence it is that the Buddha preached the doctrine Vaipulya¶: in which He criticised and rejected their aims and works, and in which He signally worsted them; comparing them with lepers.

It was the Buddha's earnest purpose to enable the students of

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*Sravaka is "he who heard the voice" (of Buddha). The Sravakas are the tyros, constituting the lowest degree of saintship.—Ed.

† A Pacceka-Buddha is a Buddha for himself only; it is contrasted with a Sammâsam-Buddha, who is universal and a teacher of the world.—Ed.

‡ The four noble truths are (1) the existence of suffering, (2) the recognition of ignorance as the cause of suffering, (3) the extinction of suffering by the cessation of lust, and (4) the eight paths that lead to the cessation of lust. The eight paths that lead to the cessation of lust are: (1) right understanding, (2) right resolutions, (3) right speech, (4) right acts, (5) the right way of earning a livelihood, (6) right efforts, (7) right meditation, and (8) the right state of mind.—Ed.

§ The twelve chains of causation (the twelve nidânas) are a formula which describes the concatenation of ignorance, suffering, and the extinction of suffering.—Ed.

‖ Mr. Ashitsu here refers to the six kinds of Abhiññâ or supernatural talents of Buddha which he acquired under the Bodhi tree shortly before he attained enlightenment. These are, (1) The celestial eye which perceives everything. (2) The celestial ear which comprehends every sound. (3) The ability of transformation so as to be everything for everybody. (4) The knowledge of previous states of existence. (5) The faculty of understanding the minds of others. (6) The knowledge of the ends of all things.—Ed.

¶ The Vaipulya or Mahâvaipulya sûtras, lit. "sûtras of unlimited meaning," contain Mahâyâna doctrines.—Ed.

the Tripitakas * to follow the One Vehicle, by purging their mind of imperfection and by looking higher and ever higher for ideals.

Therefore, we find in Buddhism a chief doctrine, that of the Mahayana† school, which is not understood by ordinary men, but only by Bodhisatvas, or aspirants for Buddhahood.

We read in the Vimalakirttinirdesa Sutra: "All Sravakas that hear this mysterious law of Moksha‡ (Deliverance), will spontaneously cry out aloud, so as to cause the world to tremble. But the Bodhisatvas will greatly rejoice and gladly accept it."

In this He has mixed the twofold and the threefold doctrine; has confounded the lower and the higher teaching; and has explained the laws anent annihilation. He has taken annihilation in a lower sense and elevated it into a higher; has rejected its partial sense for its full sense; has destroyed its temporal sense for its eternal sense.

For years our Lord, the Buddha, worked at this; and when the hour came that His work was perfected, He put before the world the sure and speedy means of salvation (the "True State of Things"). Hence it is, that men of every kind of disposition (those of the Three Vehicles: Sravakas, Bodhisatvas, and Pacceka-Buddhas, and Tchandhi) are here led into the One Vehicle, the Saddharmapundarika Sutra, (the Lotus-of-the Good-Law Scripture). In short, the Buddha's object was, according to the Saddharmapundarika Sutra, to cause all men to enter into the deep secret of "opening and entering into the wisdom and perception of the Buddha"; and to

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* Tripitaka, literally translated, "three baskets," i. e., three collections of books, a name of the Buddhist canon.—Ed.

† The Mahâyâna or great doctrine teaches that the attainment of Nirvâna is the complete understanding of truth, while the Hinayâna or small doctrine regards Nirvâna as extinction. The conception of the Mahâyâna in Western Buddhism (in the Lamaism of Thibet) is fantastical and full of apocryphal traditions, while the Buddhism of Japan is, upon the whole, sober.—Ed.

‡ Moksha is an attitude of mind which is attained by reflexion and concentration of thought. We read in the *Outlines of the Mahâyâna* by S. Kuroda, Superintendent of Education of the Jôdo-sect, Tokyo, Japan, 1893, p. 6: "Rising above love and hatred, not seeing friend or enemy, right or wrong, and abiding in the truth even among worldly relations, passing the time peacefully and thus attaining to perfect freedom from all restraints; this is the state of the true Moksha."—Ed.

cause them to attain to the unspeakable state of Mahaparinirvana *; and this, by setting before them, first, the temporal teaching, and then, the eternal.

Let it be understood that the Law which the Buddha perceived innermost, is not communicable by words or signs, but only by thought. And this communication is termed, the "impression of the Buddha's spirit." When a man gets this impression he attains, among other things, to great powers, and becomes active and free. As this thought-transference is common within the Buddhist Brotherhood, whereby the Buddha's spirit is transmitted from teacher to teacher, it has come to pass, that the Buddha-doctrine is exceedingly prosperous among men; that its future is bright; and that it promises to become universal in influence.

The Tripitakas were compiled after the Master's death. But the Tripitaka of the Lesser School is not the same as that of the Greater School. Concerning the compilation of the Scriptures of the Greater School, a work entitled "Gi-rin-sho," gives two versions: (1) that the Hindus compiled them at the same time as they compiled those of the Lesser School, from thought-traditions; and (2) that the Bodhisatva Maitreya and Ananda went together into a valley of Mount Tchakravala, and, according to Chito-sastra, compiled them there.

At this day the Buddhist Brotherhood may be distinguished into three schools: (1) the Southern, which abides in Siam, Burmah, and Ceylon; (2) the Northern, which abides in Tibet, China, Mongolia, and Mantchuria; and (3) the Eastern, which abides in Japan. The Southern school follows the Lesser Doctrine; the Northern is Lamaistic; both exoteric and esoteric; and the Eastern follows the Greater Doctrine.

In the seventh year of the Eirei period, in the reign of the Emperor Ming, of the later Hang dynasty of China (67 A. D.), Buddhism was introduced into China; and thence, in the thirteenth year of the reign of the Emperor Kimmei (552 A. D.), it came into

* Nirvâna, parinirvâna, and mahâparinirvâna have become synonymous terms. —Ed.

Japan. The King Sing-Ming of Kurara (in Ancient Korea) presented an image of the Buddha, and some of the sacred books, to the Japanese Court.

In India, far back in time, the Buddha-teaching was diligently propagated by King Asoka, and flourished throughout that Peninsula. About six hundred years after the Buddha, the Bodhisatva Asvaghosha wrote the Mahayana Sraddhatpada Shastra (the "Book on Faith in the Mahayana"); and many great ascetics, like Nagarjuna,* Deva,† Asamga,‡ and Vasubandhu,§ arose, and the Mahayana school flourished amain. But centuries later, the students of this school were greatly persecuted by the Brahmans; and, later still, the Mohammedans invaded India and rooted out the whole Brotherhood. After the sixteenth century, the teachings of the Greater and Lesser Schools were found only in Bhootan, Kashmir, and Nepal, in the North, and in Ceylon, in the South.

In China the Good Law spread quickest after the later Han dynasty, and became most powerful in the time of the Tang and Sung dynasties. But its influence lessened considerably in the time of the Yuen and Ming dynasties.

* * *

I will now give my readers an outline of Japanese Buddhism, and especially of the spirit of the Mahayana School in Japan. The special doctrines of the Tendai, Jodo, Zen, Shin, Nichiren, Holy Path, and pure Land Schools, I omit, as they may be found in the respective scriptures of these schools.

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* Nâgârjuna, the fourteenth patriarch and author of fifty books, famous for his dialectic abilities; he is said to be the greatest philosopher and subtlest thinker of Buddhism. He taught that the soul is neither existent nor non-existent, neither eternal nor non-eternal, neither annihilated by death nor non-annihilated. His death is given in B. C. 212 or A. D. 194.—ED.

† Deva, the nineteenth patriarch, is the author of nine books and a prominent antagonist of Brahmanism.—ED.

‡ Asañgha lived, about 550 A D., in Oude. Strongly influenced by Brahmanism and Sivaism, he became the founder of a new school, called the Yogâtchârga or Tantia school. His works were translated into Chinese 590–616 A. D.—ED.

§ Vasubandhu, a native of Rajagrika and a disciple of Nâgârjuna, is counted as the twenty-first or twenty-second patriarch Like his master, he taught the Amitâbha doctrine. Amitâbha means "boundless light."—ED.

When the Buddhist Scriptures were brought from India to China by scholars who were deeply versed both in doctrine and in linguistic science, they were faithfully translated into the Chinese language; and the emperors of those times encouraged the work by liberal contributions. The translation of the Saddharmapundarika * Sutra by Kumaragiva † in the Tsing dynasty of the Yo family, and of the Mahapragnaparamita Sutra by Hiouen Tsang, in the Tang dynasty of the Li family, were made by imperial orders; and many of the foremost scholars were commissioned to assist in the work. Thus the emperors reverenced the Sacred Doctrines; and the translations were scholarly and perfect, in harmony with the spirit of the Buddha; and shone like bright jewels in the literary sky.

But, who threw a new light upon the Saddharmapundarika Sutra; who wrote the great commentary and doctrinal exposition of it, and brought before the world its profound secrets? The great teacher Chi-sha of the Tendai school! He fathomed the deep teachings of the Buddha, and gathered them together: a work as great as any ever done. Thus the fulfilment of the Law took place in the Tendai school.

When the Buddha-doctrine began to spread in Japan, the philosopher Den-gio, the founder of the Tendai school on Mount Hiei, began to promulgate the special doctrine of the Tendai (805 A. D.), and thus made known the teachings of the Saddharmapundarika Sutra. Thus he made manifest the sure and quick path of Salvation, and established the Mahayana School in Japan.

Besides this, he concentrated in the Tendai school the "Three Laws of Secrecy" (of the True Word), "Contemplation" (of the Bodhidharma), and the "Moral Precepts" (of the Mahayana); and caused the principles of his school to be widely circulated. Hence it is, that the Tendai school teaches the profoundest truths.

The Buddha-doctrine, ever powerful for good throughout Asia,

* Saddharma means literally "the wonderful law"; pundarika means "the white lotus."—ED.

† Kumârajîva, a native of Kharachar, was a great expositor of the Mahâyâna. He was carried a prisoner to China (A D. 383), where he translated many of the sacred books. He is "one of the four suns of Buddhism."—ED.

has now its chief centre on Mount Hiei, the starting-point of Japanese Buddhism: and any commentary or summary of Buddhist doctrine and meditation would be imperfect unless measured by the standard of the school of Mount Hiei. Hence I will set before the reader the Buddha-doctrine according to this school; interspersed with a few remarks of my own. I shall do as the weaver, who mixes warp and woof into one cloth. I shall use the Buddha Sakyamuni's teaching as the warp, and the Tendai's doctrine as the woof, and so produce a beautiful sample of the sacred teachings of the Buddha. My aim shall be to point out the Buddha's wisdom and perception as the secret heritage of all men.

As the first gate of initiation into the genuine Buddha-doctrine, and the degrees of progress therein, are plainly and fully stated in the Tendai scriptures, and in the works on "Secrecy," "Contemplation," and "Moral Precepts," I shall omit them here, and confine myself to the general spirit of it.

The Law of our Lord, the Buddha, is not a natural science or a religion but a doctrine of enlightenment: and the object of it is to give rest to the restless; to point out the Master (the Inmost Man) to those that are blind and do not perceive their Original State.

Without deep meditation and a full understanding of the Doctrine of Enlightenment, no one can attain to onement with the Master within. He that would know the spirit of the Good Law should not idle away his time in books and scriptures, nor fatten upon the thoughts of others, but should meditate upon his own state of life and conduct: closely guard his mind and senses; and learn who, in himself, it is that thinks and feels: this being the key that opens the gate which leads into the Path of Buddha. For he who does not suffer his mind to wander, but closely and incessantly watches himself can, as it were, discover the great Path in his own right hand. He can fathom the nature of true peace of mind, and the very inmost spirit of the Buddha's teaching.

It is then, the first duty of him who would become a Buddhist, to know and perceive the root of the daily phenomena of the senses; and then to compare this knowledge and perception with the teachings of the Sacred Scriptures, the mirrors which reflect his thoughts,

so as to learn the right and wrong. The scriptures will indicate whether the thoughts and phenomena are right or wrong.

O brethren! Open your eyes and look! Why are we here? With the sky above and the earth beneath us? Why do we behold about us the innumerable phenomena of Nature? Are they not the reflex images of our thoughts? Are not we the creators of these things; of the whole? Where is the God-Creator, if not within us?

The six roots (eye, ear, nose, tongue, body, and thought) meet the six objects (form, sound, smell, taste, touch, and things), and, behold, creation! The eye meets form, and knowledge or perception results: the eye has no self or another principle; the form has nothing that can be taken or rejected; and the knowledge or perception has no birth nor death. Dear reader, think deeply.

O brethren, hearken unto me! These are the voices of the images of our thoughts: sounds of every description: inanimate, animal, human. They are all heard by the action of our Innermost Mind. They are not the work of any extra-human, extra-cosmic god. The ear cannot hear; sound is not harmonious or inharmonious; knowledge or perception is not learned or unlearned. Dear reader, think deeply.

O brethren, inhale the air about you! Is it fragrant or foul? Then, it is your mind that makes it so. No creator, no god makes it so; but your mind. The nose meets an odor, and knowledge or perception results. The nose is neither fragrant nor foul; the odor is neither this nor that; the knowledge or perception is neither transmigration, nor Nirvana. Dear reader, think deeply.

O brethren, consider your tongue. Why does it taste and speak? Does a god make it taste and speak? Are not the taste and the speech the results of the mind? The tongue meets the object, and knowledge or perception is the result. Naturally there is nothing good or bad in the tongue; the object of taste is neither knowledge nor ignorance; and knowledge or perception is neither existence nor non-existence. Dear reader, think deeply.

O brethren, look at your body! Why does it feel? Why does it work? Is it of a god or of the mind? The body meets an object, and the sense of touch arises. The sense of touch arises when the

mind is with the body. The body is neither past nor present; the object of touch is neither present nor future; and there are no temporal names of men and Buddhas. Dear reader, think deeply.

O brethren, consider your thought! Why are there thoughts, imaginings, guessings, and considerings? Are they of a god, or of your mind? When the light of the mind joins the thought, we call that "thinking." When the thought joins external objects, the knowledge of thought or mind arises. Naturally, the thought-root itself does not move nor rest; the external objects are neither good nor bad; and the knowledge of the thought-root is neither just nor unjust. Dear reader, think deeply.

We should *not* say that the objects about us, be they small or large, are *within* or *without* our mind. All living beings about us are equal from eternity, let them differ ever so much in sex, station, and knowledge: not one should be loved or hated above another; and no distinction should be made between self and neighbor. To grasp the fact that the six roots (the five organs of sense and the thought) are at onement with the One Mind, and are, therefore, naught but the One Self-conscious Mind, is the surest way to attain unto the state of Buddhahood.

The actions apparent in the Six Roots are the various lights from the One Mind, and the objects of the Six Roots are Its images. He who is free from every outside state and bond, such as superstition, priest, church, saviour, and god, and who, therefore, enjoys real freedom of mind, is a Great Man, for he has attained unto the wisdom and perception of Buddhahood; he has, to use the words of the Swedish mystic, Swedenborg, "*inwardly in himself seen his Divine Being*," which is the Buddha in man. And he that aims at the attainment of this onement with that Inmost Mind is called a disciple of the Buddha. But he whose thoughts are not centered for this aim is ignorant. The chief end in view of the Buddha-teaching is the dispersion of the darkness of ignorance and the attainment of enlightenment.

To know the Mind as it is in itself, is to know and understand the secrets of Nature. Ignorance of what the Mind is in itself causes confusion, so that the objects of sense seem to be independent of

the Mind; and in this way is the understanding of their real nature frustrated. And the attainment of enlightenment, through the dispersion of the darkness of ignorance, is at the same time the knowledge and perception of the Mind as it is: the attainment of universal wisdom.

The Saddharmapundarika Sutra teaches us how to obtain that desirable knowledge of the Mind as it is in itself. Many other scriptures teach the same; but as they are interspersed with various teachings, temporal and eternal, lesser and greater, partial and full, they create confusion, and so fail in the main. The sutras preached before the Saddharmapundarika contain more of the nature of the temporal than of the eternal law. Hence it is said, in the Amitartha Sutra, that the Truth is not yet made manifest during the past forty years. But in the study of the Saddharmapundarika Sutra, the scholar has to rise above the mere literal or exoteric sense, the yellow or red pages; otherwise its spirit will elude him, and he will remain a stranger to its secrets.

All scriptures are images of the One Mind: so that if we take these images for the realities which they represent, we remain forever in the dark; and no matter how soul-stirring and blessing they may be in themselves, they are to us practically inert and unblessing; and not only so, but also positive fetters that impede spiritual progress.

In view of this, it is not to be wondered at that a wise man of old said: "A sage set turning the wheel of the Saddharmapundarika Sutra, but every sciolist that touches it is turned by it."

Mind is the One Reality, and all scriptures are the micrographic photographs of its images. He that fully grasps the Divine Body of Sakyamuni, holds ever, even without the written Sutra, the inner Saddharmapundarika in his hand. He ever reads it mentally, even though he would never read it orally. He is unified with it, though he has no thought about it. He is the true keeper of the Sutra.

Let me here give a brief account of the spirit of the Noble Doctrine, according to the Mahayana scriptures, which the Buddha Sakyamuni, the Nirmanakaya, or Glorified Body, of the incarnate

Buddha, that is, the historical, not the doctrinal, Buddha, had in view.

The Buddha Sakyamuni gave us the great Pitaka, which consists of some odd five thousand volumes, and which was given in the course of about fifty years. In this His teaching varies greatly: here it is thus, and there it is thus. "I have," said He, "preached, I now preach, and I shall preach to you the Supreme Doctrine of the Lotus of the Good Law." But, in His last hours, when about to pass into the full Nirvana, he said: "From the dawn of my initiation to the sunset of my Nirvana, I have not preached a word." And why did He say this? If we look at the matter from a mental point of view, oral preaching is not real preaching; the sermon of a whole day equals silence, but a sermon of good deeds may be effective. The Law of Mind is indeed unutterable; it cannot be described by words, try we ever so hard. It eludes our best and strongest efforts. It lacks a mundane name. Our Lord, the Buddha, said: "I have not preached it." And, "It is beyond the sphere of human word, thought, and imagination." To speak of the Law of Mind is like trying to paint the air: as in itself the air is free and void of every obstacle, so is also the Mind. The Mind is free from every hindrance: it is not graspable. And as this is its nature, it naturally is not to be fully expressed.

Now, he that understands the Law of Mind, inexpressible in human language, is styled a Buddha. Nirvana, the Middle Path, and the True State, are other terms that describe his state. He is free, pure, and incomprehensible to the carnal man. He is the Lotus of the Good Law.

The Saddharmapundarika Sutra is the Body of all the Buddhas. Those who abide, walk, and confide in the spirit of this Sutra, who pray the Original Prayer, that is, attain unto enlightenment and deliver others by means of it, are true Saviours. The founders of the various Buddhist schools have been such; and we must follow their virtuous example.

Our true Master, the Lord Buddha, who appeared in this world as a venerable monk, who lived and preached for eighty years, who consumed the dross of this earthly life, and who entered Nirvana,

has no passion-flame in Him. And he that reveres and obeys this Master and lives in the spirit of the Saddharmapundarika Sutra preached by Him, is a true follower of the Doctrine of Enlighten ment.

The Buddha-life esteems highly both meditation and intelligence, as means of dispersion of confusion and of attainment of enlightenment; but there is no profit in either; peace of mind and onement with life are out of the question, unless we open our Mind and free it from confusion, and perceive in us the Divinity.

As the scriptures were preached by the Buddha in a state of enlightenment, they contain many degrees of teaching, high and low, deep and superficial, adapted to the reader's state of intelligence, or his degree of meditation and comprehension. If a man's mind is in the Path and in harmony with the Buddha's mind, the scriptures seem to be preached by himself, rather than by the Buddha. And though there are many scriptures that represent the minds of men, yet the Saddharmapundarika is the most important.

Many scriptures contain the mental and primary doctrines concerning the attainment of Buddhahood by all men; but none so clearly and perfectly as the Saddharmapundarika: for it points out the way to that attainment in a most concise and sure manner. Now, what is this Sutra? Does it contain merely letters, words, pages, leaves, and covers? Indeed, no! It contains our mind itself. The material sutra of eight volumes is of no earthly use if detached from our mind. Although much esteemed by Buddhists, as containing the seal of the Buddha's mind, still, since fire can consume it, it is not more so than any other scripture. In reading the true Sutra, which bears in itself marks of the Buddha's mind, we may be in the state of the "Lotus of the Good Law," and so in onement with the Buddha Sakyamuni. If we attain to onement with this Buddha, our hope is then perfected and fulfilled. This is our only hope, and we need no other. Therefore, it is just to say, that when we open and unfold our mind, and become enlightened, and attain to the state of the Buddha Sakyamuni, the scriptures are of very little use to us.

If we cling to the literal scriptures, we are evidently in a state

in which the true meaning of the Sutra is foreign to us, and in which confusion and passion fetter us. The sage regards the scriptures as guide-posts toward the Path of Mind; when he has found and entered that Path, he needs them no longer.

It was said of old: "All the Sutras are nothing but fingers that point out the shining moon." When once we see the moon, pointers are no longer necessary. If we adhere to the literal sense of sutras, and their commentaries, and interpretations, we miss the spiritual sense, and we grow old and die in darkness. We are then exoteric disciples of the Buddha, instead of esoteric. Without the spiritual sense we can never understand the Good Law.

It is laudable to count the rosary, wear the yellow robes, and read sutras before images of the Buddha; but this is formal, not essential, discipleship. Essential discipleship requires a perception of the divine meaning of the Buddha, and thought, speech, and action in accordance with it. The disciple must not, in any attitude, be it walking, sitting, or lying down, take his mind from the divine sense of the Buddha. An unswerving adherence to this sense makes him a follower of the Mahayâna doctrine and a true Buddhist.

The Good Law, in its essence, is indeed not easy of comprehension; but earnest aspiration and deep thought lead to the truth.

ZITSUZEN ASHITSU.

HIEISAN, OMI, JAPAN.

ON THE CONNEXION BETWEEN INDIAN AND GREEK PHILOSOPHY.*

BEFORE I enter upon the discussion of the questions for which I have the honor of asking your kind attention, I think it necessary to sketch briefly the two philosophical doctrines of Ancient India which principally come into consideration for my purpose.

In the earliest philosophical works of India, in the oldest Upanishads, we meet with an idealistic monism which later acquires the name of Vedânta. It is true, those works abound in reflexions on theological, ritualistic, and other matters, but all these reflexions are utterly eclipsed by the doctrine of the Eternal-*One*, the *Âtman* or *Brahman*. The word Âtman originally meant "breathing," then "the vital principle," "the Self"; but soon it was used to signify the Intransient ONE which is without any attribute or quality—the All-Soul, the Soul of the World, the Thing-in-Itself, or whatever you like to translate it. Brahman on the other hand, originally "the prayer," became a term for the power which is inherent in every prayer and holy action, and at last for the eternal, boundless power which is the basis of everything existing. Having attained this stage of development, the word Brahman became completely synonymous with Âtman. The objective Brahman and the subjective Âtman amalgamated into one, the highest metaphysical idea; and this amalgamation comprises the doctrine of the unity of the subject and the object. In numerous parables the Upanishads try to describe

*An address delivered before the Philological Congress of the World's Fair Auxiliary at Chicago, July 12, 1893.

the nature of Brahman, but all their reflexions culminate in one point: the inmost Self of the individual being is one with that all-pervading power (*tat tvam asi*, "thou art That").

This spiritual monism challenged the contradiction of Kapila, the founder of the Sâmkhya philosophy, who, in a rationalistic way, saw only the diversity, but not the unity of the universe. The Sâmkhya doctrine—the oldest real system of Indian philosophy—is entirely dualistic. Two things are admitted, both eternal and everlasting, but in their innermost character totally different; namely, matter and soul, or better a boundless plurality of individual souls. The existence of the creator and ruler of the universe is denied. The world develops according to certain laws out of primitive matter, which first produces those subtile substances of which the internal organs of all creatures are formed, and after that brings forth the gross matter. At the end of a period of the universe the products dissolve by retrogradation into primitive matter; and this continual cycle of evolution, existence, and dissolution has neither beginning nor end. The psychology of this interesting system is of special importance. All the functions which ordinarily we denote as psychic, i. e., perception, sensation, thinking, willing, etc., according to the Sâmkhya doctrine, are merely mechanical processes of the internal organs, that is, of matter. These would remain unconscious, if it were not for the soul which "illuminates" them, i. e., makes them conscious. No other object is accomplished by soul. Soul is perfectly indifferent and, therefore, also, not the vehicle of moral responsibility. This office is assumed by the subtile or internal body, which is chiefly formed of the inner organs and the senses, and which surrounds the soul. This internal body accompanies soul from one existence into another, and is, therefore, the real principle of metempsychosis. It is the object of the Sâmkhya philosophy to teach people to know the absolute distinction between soul and matter in its most subtile modifications, as it appears in the inner organs. A man has attained the highest aim of human exertion, if this distinction is perfectly clear to him: discriminative knowledge delivers soul from the misery of the endless flow of existence and abolishes the necessity of being born again. The Sâmkhya philosophy is al-

ready saturated with that pessimism which has put its stamp on Buddhism, the outcome of this system.

For the following reflexions it is necessary to bear in mind that the Vedânta of the Upanishads and the Sâmkhya philosophy had both spread through Northern India before the middle of the sixth century before Christ.

The coincidences between Indian and Greek philosophy are so numerous that some of them were noticed immediately after the Indian systems became known to Europeans.

The most striking resemblance—I am almost tempted to say sameness—is that between the doctrine of the All-One in the Upanishads and the philosophy of the Eleatics. Xenophanes teaches that God and the Universe are one, eternal, and unchangeable; and Parmenides holds that reality is due alone to this universal being, neither created nor to be destroyed, and omnipresent; further, that everything which exists in multiplicity and is subject to mutability is not real; that thinking and being are identical. All these doctrines are congruent with the chief contents of the Upanishads and of the Vedânta system, founded upon the latter. It is true, the ideas about the illusive character of the empirical world and about the identity between existence and thought are not yet framed into doctrines in the older Upanishads; we only find them in works which doubtlessly are later than the time of Xenophanes and Parmenides. But ideas from which those doctrines must ultimately have developed, are met with in the oldest Upanishads; for it is there that we find particular stress laid upon the singleness and immutability of Brahman and upon the identity of thought (*vijnâna*) and Brahman. I therefore do not consider it an anachronism to trace the philosophy of the Eleatics to India.

But even earlier than this can analogies between the Greek and Indian Worlds of thought be traced. Thales, the father of the Grecian philosophy, imagines everything to have sprung from water. This certainly reminds us of a mythological idea which was very familiar to the Indians of the Vedic time; namely, the idea of the primeval water out of which the universe was evolved. Even in the oldest works of the Vedic literature there are numerous passages

in which this primeval water is mentioned, either producing itself all things or being the matter out of which the Creator produces them.

Fundamental ideas of the Sâṁkhya philosophy, too, are found among the Greek physiologers. Anaximander assumes, as the foundation (ἀρχή) of all things, a primitive matter, eternal, unfathomable and indefinite, the ἄπειρον, from which the definite substances arise and into which they return again. If you now advert to the Sâṁkhya doctrine, that the material world is produced by Prakṛiti, the primitive matter, and, when the time has come, sinks back into it, the analogy is evident. Let us proceed to another example. There is Heraclitus, the "dark Ephesian," whose doctrine, it is true, touches Iranian ideas in its main points. Nevertheless it offers several parallels with the views of the Sâṁkhya philosophy. The πάντα ῥεῖ of Heraclitus is a suitable expression for the incessant change of the empirical world, set down by the Sâṁkhya, and his doctrine of the innumerable annihilations and re-formations of the Universe is one of the best known theories of the Sâṁkhya system.*

But let us turn to the physiologers of later times. The first with whom we have to deal is Empedocles, whose theories of metempsychosis and evolution may well be compared with the corresponding ideas of the Sâṁkhya philosophy. But most striking is the agreement between the following doctrine of his, "Nothing can arise which has not existed before, and nothing existing can be annihilated," and that most characteristic one of the Sâṁkhya system about the beginningless and endless reality of all products (*sat-kâryavâda*), or—as we should put it—about the eternity and indestructibility of matter.

In a similar way, a connexion may be traced between the dualism of Anaxagoras and that of the Sâṁkhya philosophy. And notwithstanding his atomism, which is certainly not derived from India,†

* Colebrooke, *Miscellaneous Essays*, second edition, Vol. I, p. 437, discovers other analogies between the philosophy of Heraclitus and the Sâṁkhya doctrine.

† For it is beyond doubt that the Indian atomistical systems, Vaiçeshika and Nyâya, were conceived a long time after Leucippus and Democritus.

even Democritus in the principles of his metaphysics, which probably are rooted in the doctrines of Empedocles, reminds us of a Sâṁkhya tenet, which is in almost literal agreement with the following: "Nothing can rise from nothing." * The same is true of his conception of the gods. To Democritus they are not immortal, but only happier than men and longer-lived; and this is in perfect harmony with the position the gods occupy not only in the Sâṁkhya but in all Indian systems. According to Indian ideas, the gods are subject to metempsychosis like human beings, and they also must step down, when their store of merit, formerly acquired, is exhausted. Says Çaṁkara, the renowned Vedântist, in his commentary on the Brahmasûtra (I. 3. 28): "Words like 'Indra' mean only the holding of a certain office, as the word 'general' for instance; he who at the time occupies this post is called 'Indra.'"

The same ideas are met with in Epicurus, whose dependency upon Democritus must needs have brought about a resemblance. But also on matters of other kinds Epicurus has laid down principles which in themselves as well as in their arguments bear a remarkable resemblance to Sâṁkhya doctrines. Epicurus, in denying that the world is ruled by God, because this hypothesis would necessitate our investing the deity with attributes and functions that are incongruous with the idea of the divine nature, gives voice to a doctrine that is repeated by the Sâṁkhya teachers with unfatiguing impressiveness. We also occasionally meet, in the systematic works of the Sâṁkhya philosophy, a favorite argumentative formula of Epicurus, "Everything could rise from everything then."

It is a question requiring the most careful treatment to determine, whether the doctrines of the Greek philosophers, both those here mentioned and others, were really first derived from the Indian world of thought, or whether they were constructed independently of each other in both India and Greece, their resemblance being caused by the natural sameness of human thought. For my part, I confess I am inclined towards the first opinion, without intending to pass an apodictic decision. The book of Ed. Röth ("Geschichte

* Comp. *Sâṁkhyasûtra*, I. 78.

unsrer abendländischen Philosophie," first edition 1846, second edition 1862), the numerous works of Aug. Gladisch, and the tract of C. B. Schlüter ("Aristoteles' Metaphysik eine Tochter der Sâṁkhya-Lehre des Kapila," 1874)—all go too far in their estimation of Oriental influence and in the presentment of fantastical combinations; moreover, they are all founded upon a totally insufficient knowledge of the Oriental sources.* Nevertheless, I consider them to contain a kernel of truth, although it can hardly be hoped that this kernel will ever be laid bare with scientific accuracy. The *historical possibility* of the Grecian world of thought being influenced by India through the medium of Persia, must unquestionably be granted, and with it the possibility of the above-mentioned ideas being transferred from India to Greece. The connexions between the Ionic inhabitants of Asia Minor and those of the countries to the east of it were so various and numerous during the time in question, that abundant occasion must have offered itself for the exchange of ideas between the Greeks and the Indians, then living in Persia.†

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* Compare also the treatise of Baron v. Eckstein "Ueber die Grundlagen der Indischen Philosophie und deren Zusammenhang mit den Philosophemen der westlichen Völker," *Indische Studien*, II. 369–388. Even earlier than this, such questions were treated with astounding boldness. With a facility of conception peculiar to him, Sir William Jones (Works, quarto ed., 1799, I. 360, 361) perceived the following analogies: "Of the philosophical schools it will be sufficient, here, to remark that the first Nyáya seems analogous to the Peripatetic; the second, sometimes called Vaiçeshika, to the Ionic; the two Mímánsás, of which the second is often distinguished by the name of Vedánta, to the Platonic; the first Sánkhya, to the Italic; and the second or Pátanjala, to the Stoic philosophy: so that Gautama corresponds with Aristotle; Kanáda, with Thales; Jaimini, with Socrates; Vyása, with Plato; Kapila, with Pythagoras; and Patanjali, with Zeno. But an accurate comparison between the Grecian and Indian schools would require a considerable volume."

† In Ueberweg's *Grundriss der Geschichte der Philosophie*, revised and edited by Heinze, sixth edition, I. 36, I am happy to find the following passage: "With much better reason we could suppose a considerable Oriental influence in the form of a direct communication of the older Grecian philosophers with Oriental nations." But I am sorry to say, I cannot concur with the opinion of the author, expressed on the same page, that a perfect and decisive solution of this problem might be expected from the progress of Oriental studies. For even the closest acquaintance with the Oriental systems and religions cannot do away with the alternative, before mentioned on page 180; and, with one single exception, which I shall presently consider, the means for fixing the limits of these foreign influences upon the older Grecian philosophy are utterly wanting.

Add to this the Greek tradition that the greater part of the philosophers with whom we have dealt, Thales, Empedocles, Anaxagoras, Democritus, and others, undertook journeys, sometimes of considerable duration, into Oriental countries for the sake of making philosophical studies, and the probability of our supposition that these Grecian philosophers acquired Indian ideas on Persian ground will be increased. But it cannot be denied that, if they really did borrow foreign ideas, they well understood the art of impressing on them the stamp of the Grecian intellect.

Hitherto, I have purposely omitted a name which is much more intimately connected with this question, than the others I have mentioned. While, for the derivation of Indian ideas in the case of the Grecian physiologers, the Eleatics and Epicurus, I could only assume a *certain probability* in favor of my hypothesis, there seems to be no doubt about the dependence of Pythagoras upon Indian philosophy and science; and all the more so, as the Greeks themselves considered *his* doctrines as foreign. It was Sir William Jones (Works, 8vo ed., III, 236)* who first pointed out the analogies between the Sâmkhya system and the Pythagorean philosophy, starting from the name of the Indian system, which is derived from the word *samkhyâ* "number," and from the fundamental importance attached to number by Pythagoras. After Jones, Colebrooke (Misc. Ess., 2d ed., I. 436, 437) expressed with even more emphasis the idea that the doctrines of Pythagoras might be rooted in India. He says: ". . . . Adverting to what has come to us of the history of Pythagoras, I shall not hesitate to acknowledge an inclination to consider the Grecian to have been . . . . indebted to Indian instructors." Colebrooke gives the reasons for his opinion (l. c., 441 et seq.) in the following passage, which seems to me to be sufficiently important to quote in full:

"It may be here remarked by the way, that the Pythagoreans, and Ocellus in particular, distinguish as parts of the world, the heaven, the earth, and the interval between them, which they term lofty and aërial. . . . Here we have precisely the heaven, earth, and (transpicuous) intermediate region of the Hindus.

* See Colebrooke, *Miscellaneous Essays*, second edition, I. 241.

"Pythagoras, as after him Ocellus, peoples the middle or aërial region with demons, as heaven with gods, and the earth with men. Here again they agree precisely with the Hindus, who place the gods above, man beneath, and spiritual creatures, flitting unseen, in the intermediate region.

"Nobody needs to be reminded, that Pythagoras and his successors held the doctrine of metempsychosis, as the Hindus universally do the same tenet of transmigration of souls.

"They agree likewise generally in distinguishing the sensitive, material organ (*manas*), from the rational and conscious living soul (*jîvâtman*): θυμός and φρήν of Pythagoras; one perishing with the body, the other immortal.

"Like the Hindus, Pythagoras, with other Greek philosophers, assigned a subtle etherial clothing to the soul apart from the corporeal part, and a grosser clothing to it when united with body; the *sûkshma* (or *linga*) *çarîra* and *sthûla çarîra* of the Sânkhyas and the rest. . . . I should be disposed to conclude that the Indians were in this instance teachers rather than learners."

Wilson (*Quarterly Oriental Magazine*, IV, 11, 12, and *Sânkhya Kârikâ*, p. XI) only incidentally touches on the analogies pointed out by Jones and Colebrooke.

Barthélemy Saint-Hilaire goes a little more into detail regarding one point. He treats, in his "Premier Mémoire sur le Sânkhya" (Paris, 1852, pp. 512, 513, 521, 522), of Pythagoras's theory of metempsychosis, and he is right in observing that the greater probability is on the side of its Indian origin, and not on its Egyptian one. Further, Barthélemy finds Sâṁkhya ideas in Plato, in the "Phædon," "Phædrus," "Timaeus," and in the "Republic": "Les analogies sont assez nombreuses et assez profondes pour qu'il soit impossible de les regarder comme accidentelles" (p. 514). He points out that the ideas of redemption and bondage are doctrines both of Plato and of the Sâṁkhya philosophy, inasmuch as they denote the liberation of soul from matter and the confinement of soul by matter; and that the idea of metempsychosis is common to both, together with that of the beginningless and endless existence of the soul. On p. 521 Barthélemy then says that Plato, the great admirer of the Pythagorean school, took these doctrines from Pythagoras; but if we ask where Pythagoras obtained them, all the appearances are, in his opinion, in favor of India.

The supposition that Pythagoras derived his theory of transmi-

gration from India, was several times broached in older works besides.*

In a much more exhaustive and comprehensive manner, but evidently without knowledge of his predecessors, Leopold von Schroeder has also treated this subject in an essay "Pythagoras und die Inder" (Leipsic, 1884), which, notwithstanding the contrary opinion of Professor Weber,† seems to me to be perfectly correct in its main points. From Schroeder's theories it follows, that almost all the doctrines ascribed to Pythagoras, both religio-philosophical and mathematical, were current in India as early as the sixth century before Christ, and even previously. As the most important of these doctrines appear in Pythagoras without connexion or explanatory background, whilst in India they are rendered comprehensible by the intellectual life of the times, Schroeder conclusively pronounces India to be the birthplace of the Pythagorean ideas. Of course, no power of conviction would rest in *single* traits of agreement;—and for that reason I did not venture to give any definite opinion with regard to the dependence of the other philosophers mentioned on India;—but with Pythagoras, it is the *quantity* of coincidences that enforces conviction; and the more so, as the concordance is also to be noticed in insignificant and arbitrary matters which cannot well be expected to appear independently in two different places. Here I must refer to Schroeder's detailed argumentation and can only indicate the chief features which Pythagoras and the ancient Indians have in common: the theory of the transmigration of souls, in which there is harmony here and there even in noticeable details, and which Pythagoras cannot have taken from Egypt for the simple reason that modern Egyptology teaches us, that—in spite of the well-known passage in Herodotus—the ancient Egyptians were not familiar with the doctrine of metempsychosis; further, the curious prohibition of eating beans, the *πρὸς ἥλιον τετραμμένον μὴ ὀμιχεῖν*;

* See Lucian Scherman, *Materialien zur Geschichte der Indischen Visionsliteratur*, p. 26, note 1.

† *Literarisches Centralblatt*, 1884, p. 1563–1565. Compare also "Die Griechen in Indien," *Sitzungsberichte der Kgl. Preussischen Akademie der Wissenschaften zu Berlin*, XXXVII, pp. 923–926.

the doctrine of the *five* elements, i. e. the assumption of ether as the fifth element, which obtains in the Pythagorean school as well as everywhere in India; above all the so-called Pythagorean theorem, developed in the Çulvasûtras *; the irrational number $\sqrt{2}$; then the whole character of the religio-philosophical fraternity, founded by Pythagoras, which is analogous to the Indian orders of the time; and at last the mystical speculation, peculiar to the Pythagorean school, which bears a striking resemblance to the fantastical notions greatly in favor with the so-called Brâhma*n*a literature.

Schroeder proceeds with a few more analogies of lesser value and of doubtful nature, and finally he is certainly mistaken in the two following points. Namely, he holds that Pythagoras acquired his knowledge in India itself,—an idea excluded at once by reference to the history of ancient traffic.† The only country in which Pythagoras could possibly have met his Indian teachers, is Persia, to which place I above found myself obliged to ascribe the eventual mediation between Indian ideas and the Greek physiologers and Eleatics. The other point is that of the connexion between the Pythagorean doctrine and the Sâ*m*khya philosophy, supposed by Schroeder. It may be that Pythagoras acquired his knowledge of the theories of metempsychosis and of the five elements from adherents of the Sâ*m*khya system; but *further* relations are not to be discovered. Schroeder‡ tries, on pp. 72–76, to bring the fundamental idea of the Pythagorean philosophy, that number is the essence of all things, into connexion with a *fictitious*, older form of the Sâ*m*khya philosophy. He says p. 74: "To me it appears to be evident from the name Sâ*m*khya, that number (*samkhyâ*) originally had a deciding,

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* Weber's polemic against Schroeder's treatise is chiefly based on the fact that he underestimates the age of the Çulvasûtras which describe the mensurations of the sacrificial compound that led to the discovery of the renowned tenet. The Çulvasûtras are not appendages to the Çrautasûtras, but integrant parts of the great ritual complexes, each of which has been composed by *one* author. The material, offered to us in the Çulvasûtras, is of course still much older than these compendiums themselves.

† The Grecian tradition of Pythagoras having visited India did not arise before the Alexandrine time.

‡ As before him Sir William Jones; comp. p. 182 above.

fundamental importance in this system, although the later system, the books of which appeared more than a thousand years after the pre-Buddhistic Sâṁkhya doctrine of Kapila, has effaced this characteristic trait and entirely lost it." In stating this, Schroeder has overlooked the fact that those Upanishads which are full of Sâṁkhya doctrines and which must be dated only a few hundred years later than Buddha, are, in the passages in question, also wanting in what he calls the "original" characteristic trait, and that they are in harmony with that system which he calls the "later one." He himself declares this theory to be a very bold one, but in reality it is perfectly baseless. There is not the smallest particle of evidence for the hypothesis that there ever existed a Sâṁkhya system different from that of our sources, which acquired its name from the mania for enumeration peculiar to it. On the contrary, weighty reasons speak against the supposition that our system has undergone noticeable changes in the course of time. If ever we should try to fabricate some historical link between the Sâṁkhya system and the Pythagorean numeral philosophy, the following idea only could occur to us. The doctrines of Pythagoras: Number is the essence of things, the elements of numbers are to be considered as the elements of everything existing, the whole universe is harmony and number—these doctrines are unique in the history of human thought, and, if their meaning should be something else than "everything existing is ruled by the mathematical law," they might be regarded as unphilosophical. It therefore does not appear to me as a thing utterly beyond possibility, that those ideas took root in a misunderstanding of Pythagoras. It is possible that he misinterpreted the words of his Indian teacher: "The Sâṁkhya philosophy is named after the enumeration of the material principles" into: "Number is considered the essence of the material principles in the Sâṁkhya system:" But this surely is nothing but a supposition.

It is Lassen who in his "Indische Alterthumskunde" denies every Indian influence upon Grecian philosophy in ante-Christian times, but adopts it (III. p. 379 et seq.) for the Christian Gnosticism and Neo-Platonism. As lively relations between Alexandria and India are sufficiently attested for this time, it is indeed impos-

sible to doubt Indian influence upon the doctrines of the Gnostics and Neo-Platonists.

Let us first dwell upon Gnosticism. Lassen holds that the Indian elements in the Gnostic systems were derived from Buddhism which (in the secondary, modified form it had assumed at that time) undoubtedly exercised a considerable influence upon the intellectual life of Alexandria. This influence is most clearly perceptible in the ideas formed by the Gnostics about the many spiritual worlds and the numerous heavens. These ideas are certainly derived from the fantastical cosmogony of later Buddhism. But I do not admit the great importance which Lassen attributes to Buddhism in the formation of the Gnostic systems. It is my opinion that, in Lassen's expositions the Sâṁkhya philosophy does not get all that is due to it. If we keep it in mind that the centuries in which Gnosticism was developed—that is, the second and third century after Christ—are coincident with the period during which the Sâṁkhya philosophy flourished in India, many things will appear in a different light to us, than was the case with Lassen.* On p. 385 he establishes a connexion between the doctrines of Buddhism and the Gnostic contrast of soul and matter. But is it not more natural to remember here the ideas which form the foundation of the Sâṁkhya philosophy? Another point with which we have to deal is the identification of soul and light, met with among almost all Gnostics. Lassen has brought forward some remote and singular speculations from the misty and imaginative realm of later Buddhism, to make plausible the Buddhistic influence upon this Gnostic doctrine. I cannot say that this endeavor has been a successful one. How very simple and natural the idea appears with which a mere glance at the Sâṁkhya philosophy furnishes us! For there we are taught something which was evidently not known to Lassen, viz., that *the soul is light* (*prakâça*),† which

* On the other hand, I must confess that I am unable to trace that resemblance between the Sâṁkhya philosophy and the doctrine of the Valentinians on the origin of matter, which is stated by Lassen on pp. 400, 401. The agreements of the Sâṁkhya system with that of the Ophites, collected by Lassen in the following pages, likewise appear to me open to doubt.

† Comp. *Sâṁkhyasûtra*, I. 145: "[Soul is] light, because the non-intellectual and light do not belong together," and VI, 50: "Being distinct from the non-intel-

means, that the mechanical processes of the internal organs are illuminated or made conscious by the soul. This idea of the Sâṁkhyas, that soul and light are the same, or—to put it otherwise—that the soul consists of light, we undoubtedly have to regard as the source of the similar idea of the Gnostics.

In regard to another point, Lassen (on pp. 384, 398 et seq.) has rightly acknowledged the influence of the Sâṁkhya philosophy upon Gnosticism. It was Ferd. Chr. Baur who even before him (in his work, "Die christliche Gnosis," pp. 54, 158 et seq.) had noticed the remarkable agreement of the classification of men into the three classes of πνευματικοί, ψυχικοί and ὑλικοί, peculiar to several Gnostics, with the Sâṁkhya doctrine of the three Guṇas. As I have entered in detail upon this theory in my forthcoming book on the Sâṁkhya philosophy, I only wish to state here that in this system every individual is considered as appertaining to the sphere of one of the three powers, according as the luminous, serene, and joyful, or the passionate, fickle, and painful, or again the dark, motionless, and dull character predominates. There is also another interesting parallel to be found.* It is that between the Sâṁkhya doctrine according to which the Buddhi, Ahaṁkâra, and Manas, i. e., the substrata of the psychic processes, have an independent existence during the first stages of the evolution of the universe, and the Gnostic tenet which allots personal existence to intellect, will, and so on. I am sure that those who are better acquainted with the Gnostic systems than I am, would be successful in finding some more points of contact, upon studying the doctrines of the Sâṁkhya philosophy in detail.

In passing to Neo-Platonism, we find that here also Lassen has valued the influence of the Sâṁkhya doctrines to its full extent. The views of Plotinus (204–269 A. D.), the chief of the Neo-Platon-

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lectual, [soul] which has the nature of thought illuminates the non-intellectual." The commentator Vijñânabhikshu makes the following remark on the first passage: "The soul is in its essence light like the sun," etc.

* Mentioned by Fitz-Edward Hall in his translation of Nehemiah Nílakantha S'ástrí Gore's *A Rational Refutation of the Hindu Philosophical Systems*, Calcutta, 1862, p. 84.

ists, are in part in perfect agreement with those of the Sâṁkhya system. The following sentences must be placed here: the soul is free from sorrows and passions, untouched by all affections; for the sufferings of the world belong to matter. By his philosophy Plotinus promises to deliver the world from misery, and this is the same purpose as that of the Sâṁkhya system which strives to lead men to discriminative knowledge and with it to redemption, that is to say, to absolute painlessness. Though all Brahman systems have made it their task to liberate mankind from the miseries of mundane existence by means of some special knowledge, yet none of them have so much emphasised the principle of this life being a life full of misery, as the Sâṁkhya system; none of them have defined the word "redemption" with the same precision as "the absolute cessation of pain."

On page 428 Lassen establishes a connexion between a Vedântic notion and the sentence of Plotinus, that one may also be happy when sleeping, because the soul does not sleep. But there is no necessity for it. The same doctrine appertains to the Sâṁkhya system.* Deep dreamless sleep is there, too, stated to be homogeneous with redemption, insomuch as in these two states the affections and functions of the inner organs have stopped, and pain with them. Considering the many cases in which the dependence of Plotinus upon the Sâṁkhya system is established, we need not hesitate to derive this idea from the Sâṁkhya system as well. These numerous agreements must, however, make us doubly careful not to expand too much the limits of this dependence; and for that reason I am bound to say that the parallels which Lassen has drawn (p. 418 et seq.) between the theory of emanation, set up by Plotinus, and the doctrine of development in the Sâṁkhya system appear to me out of place in the series of coincidences here treated.

Though there is a good evidence of harmony between the *pure* Sâṁkhya doctrine and the Neo-Platonism of Plotinus, there exists even a closer connexion between the latter one and *that* branch of the Sâṁkhya philosophy which has assumed a theistical and asceti-

* See *Sâṁkhyasûtra*, V. 116.

cal character, and has, under the name of the Yoga philosophy, acquired an independent place among the Brahman systems. The morality of Plotinus is altogether of an ascetic nature. This feature might be explained, it is true, by an inclination towards Stoicism; but on account of its agreement with the Yoga system in the following points, this ascetic coloring has, most probably, its foundation in the influence of this system. Plotinus pronounces all *worldly* things to be vain and void of value, and he therefore calls upon us to throw off the influence of the phenomenal world. If we keep off all external impressions and by way of concentration of thinking overcome the multiplicity of ideas, resulting from these impressions, the highest knowledge will fill our mind, in the form of a sudden ecstatic perception of God. There is not the slightest difference between this theory and the doctrines of the Yoga philosophy. The ἔκστασις of Plotinus or the ἄπλωσις ("the union with the deity") is the *pratibhâ* or the *prâtibham jnânam* of the Yoga system ("the immediate, universal knowledge of truth, which, after methodically exercising the ascetic Yoga-praxis, comes upon us unexpectedly").*

Besides Plotinus, we principally have to consider his most distinguished disciple Porphyry (from 232–304),† who, even more than his master, has followed the Sâmkhya philosophy. With him the Indian influence can be proved *directly*; for he has made use of the treatise of Bardesanes, from which he copied an important passage about the Brahmans. And Bardesanes had acquired authentic information about India from the Indian ambassadors who were sent to the Emperor Antoninus Pius. In all principal points, Porphyry agrees with Plotinus, as, for instance, in his demand to give up the external world and to seek truth by contemplation; but Porphyry records in a purer way than his master the Sâmkhya doctrine of the contrast between the spiritual and the material world. His dependency upon the Sâmkhya philosophy is also to be noticed in his doctrines of the reign of the spiritual over the material, of the omnipresence of the soul when liberated from matter, and of the

* See *Yogasûtra*, III, 33.

† Comp. Lassen, p. 430 et seq.

beginninglessness of the world.* Here we must also note the interdiction to kill animals, made by Porphyry, and his rejection of sacrifices. To be sure, Lassen says, on page 432, that Porphyry here followed the Buddhistic law; but as we are dealing with things which Buddha adopted from the Sâṁkhya system,† there is no reason why we should not derive them from the primary, instead of the secondary, source.

I think we need not enter upon the resemblances which Lassen discovers (p. 434 et seq.) between Indian ideas and the later Neo-Platonist Abammon (about 300); for this fantastical and superstitious teacher, and the ideas peculiar to him, do not offer any but doubtful points of contact with Indian models. Only one opinion of Abammon comes into consideration, and that even was already suggested by his predecessors. It is the idea, that people who are filled with a holy enthusiasm attain miraculous powers.‡ Here we clearly perceive the coincidence with the conviction, universal in India, that miraculous powers are to be acquired by the methodical exercise of the Yoga-praxis. The Yoga philosophy promises, as the fruit of such exercise, the acquisition of the faculty of making one's self invisible, infinitely large, or infinitely light, of assuming other bodies, of changing the course of nature, and the attainment of other supernatural powers.

I cannot take leave of Neo-Platonism without mentioning a highly important point of agreement with the Indian world of thought, which, it is true, neither concerns the Sâṁkhya philosophy nor Buddhism, but which nevertheless impressively supports our arguments, as it is a most significant link in the series of Grecian loans from India. In a little essay by Professor Weber, "Vâch und λόγος, Indische Studien," Vol. IX, the author, with great caution—"without intending in the least to settle this question"—has put forward the supposition that the Indian conception of the *vâch* (a feminine noun, meaning voice, speech, word) may have had some influence upon the

* This last point is not mentioned by Lassen.

† Compare the preface to my translation of Aniruddha's Commentary on the Sâṁkhyasûtras, etc., Calcutta, 1892.

‡ See Lassen, p. 438.

idea of the λογος which appears in Neo-Platonism and passed from there into the Gospel of St. John. Weber starts from the hymn Rig-veda X, 125, in which the Vâch already appears as an active power, and he refers to the personification of the "divine Vâch" or language, as the vehicle of priestly eloquence and wisdom. He then traces the development of this idea through the Brâhmaṇa literature, where the Vâch becomes more and more similar to the λόγος in the beginning of the Gospel of St. John. In the numerous passages quoted by Weber, the Vâch appears as the consort of Prajâpati, the creator, "in union with whom and by whom he accomplishes his creation; yea, the Vâch is even ultimately the most spiritual begetter, and now and then she is placed absolutely at the beginning of all things, even above the personal bearer of her own self." Weber concludes this pithy article with the following words: "There are certainly no difficulties in understanding the cosmogonical position of the Vâch which is simply to be conceived as the culmination of glorifying priestly meditation and knowledge, while the same position of the λόγος, on the other hand, appears without any suggestion as to its origin or development." This idea of Weber's I hold to be an exceedingly happy one, and, in my opinion, it deserves another name than that of a mere supposition. Only I may be allowed, in this connexion, to set one point aright. It is not Neo-Platonism in which the idea of the λόγος first appears, but it is derived there from the doctrines of Philo, which to a great extent are the basis of Neo-Platonism. Philo again adopted the λόγος doctrine from the Stoics, and they took it from Heraclitus, to whom the λόγος already was the eternal law of the course of the world.* My opinion, mentioned above, of Heraclitus being influenced by Indian thought, meets, accordingly, with a welcome confirmation. If the whole theory is right—and I think it is—the derivation of the λόγος theory from India must be put more than five hundred years earlier than would appear from Weber's statement.

Among the Indian doctrines which we believed we could trace in

*Compare Max Heinze, *Die Lehre vom Logos in der griechischen Philosophie*, Oldenburg, 1872.

Greek philosophy, those of the Sâ*m*khya system occupy the first place; agreeably to their character, they presented the smallest difficulties, when transplanted to a foreign ground and embodied into a new world of thought. This influence of the Sâ*m*khya and Indian philosophy in general upon Occidental philosophy does not extend beyond Neo-Platonism. And—except the Buddhistic coloring of Schopenhauer's and Hartmann's philosophy—even in our modern time we cannot notice any real influence exercised by Indian ideas. Even in the compendiums of the general history of philosophy the Indian systems are usually entirely omitted. It now need not be proved, that this is a mistake. An explanation of this indifference may be found in the fact that the Indian systems became known in Europe and America only in their roughest outlines in this century, and that—with the exception of Deussen's excellent description of the Vedânta philosophy (Leipsic, 1883)—they have not been laid open to study by detailed works. I hope to contribute a little to fill up this gap in our knowledge of Indian philosophy, by my exposition of the Sâ*m*khya system which will appear in a few months.

I have confined myself here to seeking out, and so far as possible, to proving the *historical* connexion between Indian and Greek philosophy. But to follow up the *internal* relations of the Indian doctrines to the whole Occidental philosophy and to trace the *occasional* agreements in detail, that would have been a task, the performance of which surpasses the limits of this paper.

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A MONISTIC THEORY OF MIND.

I DO not understand the term *monistic* to imply a single process, but only a single principle. While mind may be explained as the result of one universal law there are several ways or modes in which that law operates. The unitary principle through which mind has been brought about may be comprehended under the general term *organisation*, but there are two very distinct modes or forms of organisation. One of these is the organisation of molecules to secure a greater effect from their combined activities, and may be called *chemical organisation*. The other is the organisation of biological units or cells into living organisms of higher orders, and may be called *biotic organisation*.

CHEMICAL ORGANISATION.

If the existence of matter be admitted it is scarcely more than an observed fact that all matter is at all times in a state of motion, while the law of the conservation of energy is nothing more than the inductive proof that the rate of motion of matter is fixed and unalterable, so that all attempts to constrain it merely alter the mode of its manifestation. Matter is only known by its effects which are due to its motions, and all differences in these effects are the result of such different modes of its motion, due in turn to some constraining influence. It is a known fact that under certain conditions, such, for example, as generally prevail on the earth, this power of matter to make itself known is increased in a great variety of ways through chemical organisation. This takes place through some form of union among its elements, concentrating and directing their activities in

such a manner as to render them effective in producing results, especially in appealing to the senses of sentient beings.

The products of such unions of the elements of matter are what are known as *substances*, and the modes by which different substances produce effects constitute their *properties*. The monistic theory of mind contemplates it as a property of a substance, not as itself a substance. For the law that the properties of substances are due to their molecular constitution holds for all substances whatever, no matter how low or how high in the degree of organisation, or whether the organisation be chiefly chemical or largely biotic. It holds therefore for organised beings, and the properties these possess, including life and sense, are as much due to the way in which the material elements composing them are combined as are those of the simplest mineral substances. The phenomena of mind stand in the same relation to the brain and nervous system that all other phenomena stand to the substances that manifest them—in a word, mind is a property of the organised body. The body, organised as it is, with its nervous system and great central ganglion, manifests the properties which it possesses by virtue of its constitution in precisely the same way that all other substances manifest the properties resulting from their inherent constitution.

If we exclude the universal ether all known substances fall under three general heads, viz., chemical elements, inorganic compounds, and organic compounds. For these I have, on a former occasion,* proposed the following cosmical definitions.

"*Chemical Elements.*—Substances whose molecules are composed either of those of other chemical elements of less atomic weight, or of such as are too low to be capable of molar aggregation, and therefore imperceptible to sense; formed during the progress of development of star-systems at temperatures higher than can be artificially produced, and hence too stable to be artificially dissociated.

"*Inorganic Compounds.*—Substances whose molecules are composed of those of chemical elements or of other inorganic compounds of lower degrees of aggregation; formed in the later stages of the

Popular Science Monthly, Vol. XVIII, New York, February, 1881, p. 539.

development of planets at high but artificially producible temperatures, and therefore capable of artificial decomposition, and constituting the greater part of the solid crust of cooled-off bodies, their liquid, and a portion of their gaseous envelope.

"*Organic Compounds.*—Substances whose highly complex and very unstable molecules are composed of those of chemical elements, inorganic compounds, or organic compounds of lower organisation; formed on the cooled surfaces of fully developed planets at life-supporting temperatures."

Every substance differs from every other in both its constitution and its properties, and no chemist doubts that the properties of any substance are due to its peculiar nature or constitution. That is to say, the molecular constitution of a substance is the *cause* of the properties it manifests.

Now there is an important law, to which I long ago called attention,* governing the properties of substances. According to this law *the properties of substances are more active in proportion as their molecular constitution is more complex.* In our limited knowledge of what constitutes degrees of activity this is obvious only in the long run and many apparent exceptions may be pointed out. The properties of the simpler chemical elements are very inert, those of inorganic compounds are usually much less so, their activities increasing roughly with the degree of composition, and when the organic compounds are reached we find that many of them have very active properties. The law holds for the various grades of organic compounds as we pass from the less to the more complex. The vegetable alkaloids and organic bases that furnish most of the febrifuges, narcotics, and toxics, such as quinine, narcotine, strychnine, etc., are very complex substances and possess relatively large molecules into which carbon, hydrogen, nitrogen, and oxygen all enter.

Another important law of chemical organisation is that *increase in complexity is accompanied by decrease in stability.* It is now generally believed that the chief distinction between what are called the chem-

* "The Organic Compounds in their Relations to Life." *American Naturalist*, Vol. XVI, Philadelphia, December, 1882, pp. 968-979.

ical elements, which were once supposed to be the ultimate units of matter, and the inorganic compounds, is that the former are so much more stable that it has been found impossible, by any means thus far devised, to separate them into any simpler components. Again, the distinction between organic and inorganic compounds has broken down all along the line through the artificial production of so many of the latter, formerly supposed to be formed only in the alembic of organic life. But it is here that we find the greatest instability.

Not only is it difficult to judge of degrees of activity among the properties of substances, but it is certain that these differ widely in kind. The power to affect the senses and living tissues with greater or less violence is only one of the ways in which the properties of substances manifest themselves. There are other ways in which bodies, though wanting in this class of qualities, nevertheless give evidence of possessing much higher degrees of organisation. When we rise above the organic bases in the degree of chemical complexity, we encounter a group of which the molecules are relatively enormous, so large and complex, indeed, that it often becomes impossible to write their chemical formulas with any degree of certainty. These are the albuminous compounds, and albumen itself has been estimated to contain no less than 679 equivalents, which, reduced to the standard of the hydrogen atom, would make each molecule contain 4870 of these smallest-known chemical units. And now, agreeably to the law stated, we find that the substances of this group are characterised by correspondingly great instability. As a consequence of their exalted structure their molecular activities are far more extensive and varied than those of simpler bodies. One of the principal modes in which they manifest their activities is that which is called *isomerism*, whereby a substance, without any change in the nature or number of its molecules, but by some little-understood rearrangement of them, assumes a different aspect and becomes to all intents and purposes another substance.

There is still another important principle of chemical organisation which greatly aids us in comprehending these phenomena. It may be called the law of *recompounding*. It consists simply in using the simpler compounds in the formation of the more complex ones.

That is, these are not, or at least not necessarily, first decomposed into their simpler elements and afterwards combined to form the higher unit, but the units of lower orders enter bodily into the composition of the molecules of the higher ones. Without delaying to give examples at the earlier stages of development, we may pass at once to the albuminous compounds and suppose that albumen, with molecules five thousand times as large as those of hydrogen, is a compound of various forms of proteine, whose molecules are some four hundred times as large as the hydrogen atom, and that these proteine molecules remain undecomposed and combine to give to albumen the properties it possesses. In this way the progress in organisation gained in the development of the proteine molecule is not lost, but remains in full force as a factor in the properties of albumen. But we have reason to believe that from the hydrogen atom to the molecule of albumen the process of evolution has been uniformly the same, viz., that of compounding and recompounding, of doubly and multiply compounding; in short, it has been the process of molecular aggregation.

With still higher states of aggregation, therefore, we should naturally expect still higher forms of activity, still more marked properties. What properties ought we to expect in a substance formed by the recompounding of the albuminoids? No one could predict their nature. While it is safe to predict higher properties from higher degrees of aggregation, there is no basis whatever upon which to predict the character of these properties. We cannot even say which of the three states of matter, the gaseous, the liquid, or the solid, the new compound will exhibit at ordinary temperatures. The invincible solid, carbon, when joined with oxygen, becomes a gas; the type of gases, hydrogen, when combined with another gas, oxygen, results in water, which is a solid at 32° Fahr.; the inert gas, chlorine, combined with the equally inert liquid, mercury, forms corrosive sublimate, which has very active properties and in no way resembles either of its components. And so we might go through the entire list. The general truth is that chemical union results in a new substance with new properties, different from and of a higher order than those of any that have united to produce it.

When, therefore, the highest known chemical compounds still further combine, we ought to look for something new and important. When the largest molecules whose constitution can be determined in the laboratory form themselves into higher molecular systems, we should not be surprised if the resultant substance should be an exceedingly remarkable one. The activities of all substances up to this point are molecular, but it might well be that the new compound should possess *molar* activities. At all antecedent stages of chemical organisation the spontaneous activity is confined to molecules; at this new and higher stage these spontaneous activities may be able to break over these bounds and manifest themselves in the mass.

Now we have a substance—its name is *protoplasm*—suspected of having the origin indicated, which is capable of such spontaneous movement as a mass. This wonderful property, confined exclusively to this substance, has been given the briefer name *motility*. This astonishing substance, protoplasm, whose existence was not suspected at the beginning of the nineteenth century, is now known to be an abundant product of nature, to be present in every living thing and in every part of all organic beings, if such part is really alive. It is this which makes it alive. Professor Huxley has happily called it "the physical basis of life." Not animals alone, but plants as well, have protoplasm in every living cell, and it is as active in the one as in the other.

But bound up with this principle of life, and almost as a part of it, protoplasm possesses another, and, if possible, still higher property. This property may be fittingly called *awareness*. The activities of protoplasm are not sporadic and meaningless, but systematic and purposeful. Protoplasmic bodies recognise differences in their environment. As Major Powell, in his new psychologic terminology, would probably say, they have a "knowledge of good and evil." In a word, they feel. The misnamed "pseudopodia," which they send out are really improvised antennæ or "feelers," which they employ in exploring their surroundings. Protoplasm is therefore not merely the physical basis of life, it is the physical basis of mind as well, and all nerve tissue that is essentially such consists of pro-

toplasm in some of its myriad forms. From the strictly material side, protoplasm is the essential thing in life, and it is also the essential thing in mind. There is no other element controlling either vital or psychic phenomena. When this stage of chemical organisation was reached, evolution ceased along this line. The new line of subsequent development has been that of biotic organisation, and plants and animals may be regarded simply as mechanisms for the concentration, focalisation, and intensification of the inherent powers and properties of protoplasm.

BIOTIC ORGANISATION.

Molecular aggregation or chemical organisation could not in the nature of things go farther than the production of protoplasm. This substance already oversteps the limits of molecular activity and trenches on the domain of molar motion. If matter is to produce any wider effects it must be through the organisation of protoplasmic bodies. Biology teaches us how it does this. The biological unit is the cell whose activities are determined by the protoplasm it contains. There are organisms consisting of a single cell—unicellular organisms. Then, as a first step, a group or company of these become feebly bound together so that nutrition passes from the one to the other. Such a group is called a *cœnobium*. These exhibit various gradations, and at length there are formed permanent colonies, such as polyps and sponges exhibit. Plants may be placed in this class, a tree consisting of a vast assemblage of permanently associated individuals. By an indefinite number of further steps this process of integration is carried up until the true Metazoa are reached.

But, as we saw that even protoplasm acquired the quality of awareness, so the organised states of protoplasm acquired correspondingly increased degrees of this sentient property, and *pari passu* with the development of life, there went on a development of mind. To this end a nervous system was acquired by all the higher animals, and from a series of coördinate ganglia with feeble connexions there grew up a supreme ganglion with all the subordinate ganglia completely under its control. And with still higher organi-

sation there took place a process of cephalisation, whereby, with increase of brain, there was constant increase in the mind-element

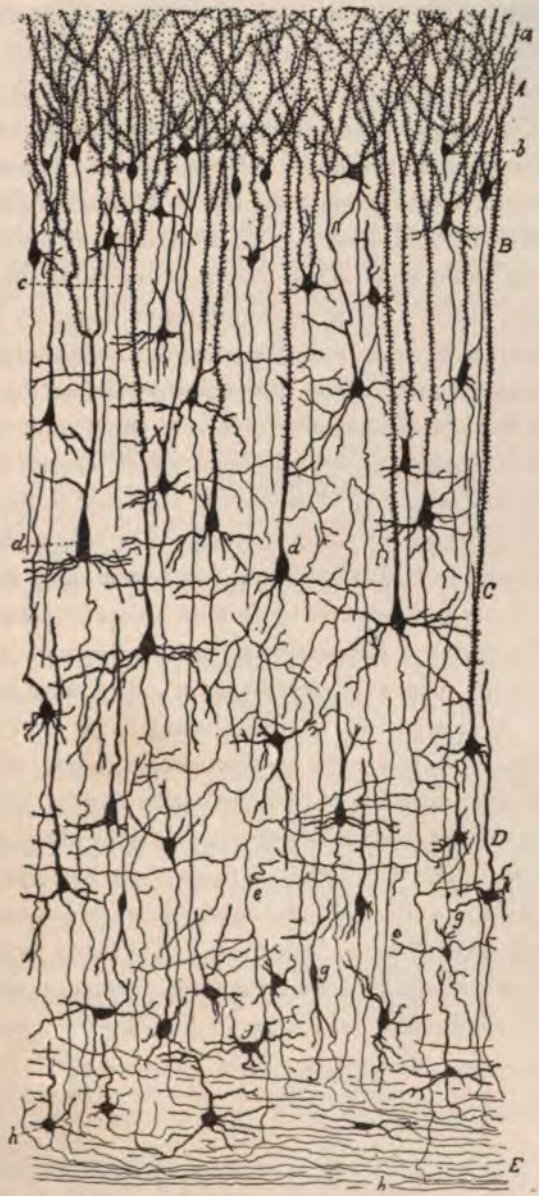

Fig. 1.—Section of the cerebral cortex (Ramón y Cajal). From the supra-ventricular region of a young mouse. A. Molecular layer. B. Small pyramidal layers. C. Large pyramidal layer. D. Layer of irregular corpuscles. E. White matter. *a*, panicles of the pyramids; *b*, smallest and most superficial of the pyramids; *c*, axis-cylinder from a small pyramid; *d*, large pyramid; *e*, its axis-cylinder; *f*, cell with ascending axis-cylinder; *g*, similar but smaller cells; *h*, cells found in the white matter; *i*, rounded cell that sends its axis-cylinder toward the white substance; *j*, cell with short axis-cylinder process.

or psychic property. When at length mammalian life was reached a highly developed brain had been evolved.

Progress in the discovery of the true nature of the brain and nervous system has been very slow and is almost exclusively confined to the last half of the present century. This was chiefly due to the want of effective methods of study. As such methods were gradually invented and introduced by Stilling, Deiters, Remak, Clarke, Müller, Gerlach, Waldeyer, Schulze, Golgi, and others, fresh light was thrown upon the whole subject, but it is only within the last few years and chiefly through the labors of His, Lenhossék, Obersteiner, Gehuchten, and Ramón y Cajal that those important advances have been made which place it upon a firm scientific footing. To Dr. Frank Baker, Curator of Comparative Anatomy in the United States National Museum and Manager of the National Zoological Park, is due the great credit of having laid before the readers of English an able and exhaustive review of the history of this important field of investigation. This paper, which cannot be too highly commended and which all should read, appeared in the *New York Medical Journal* for June 17 and 24, 1893. The accompanying figure (Fig. 1), which Dr. Baker has reproduced with slight modifications from an important memoir by Ramón y Cajal,* exhibits a section through the cortex of the cerebrum, regarded by most physiologists as the principal organ of consciousness and of mind in general. The little knots with irregularly radiating fibres proceeding from them in various directions, are the corpuscles of the brain, or brain-cells, which are scattered, not wholly without order, through the general mass from the surface of the convolutions above to the white matter below. The existence of these cells has long been known, but the nature of the thread-like processes which proceed from them has only recently been discovered. Not being an anatomist myself, and yet wishing to be altogether correct on such an important point, I shall here make use of Dr. Baker's own language:†

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* *Sur la Structure de l'Ecorce Cérébrale de quelques Mammifères*, par S. Ramón y Cajal. *La Cellule*, Vol. VII, Bruxelles, 1893, pp. 123–176, 3 plates; pl. ii, fig. 7.

† See the article mentioned above, *New York Medical Journal*, Vol. LVII, June 24, 1893, p. 685.

"It has long been known that a considerable portion of the cortex is occupied by large cells of a triangular outline, presenting a pointed extremity toward the exterior. These, the pyramidal cells of authors, are of great size in the so-called motor regions of the cortex—that is to say, in the central convolutions. . . . These structures have wide-reaching connexions, and Ramón y Cajal and Van Gehuchten have much extended our knowledge. . . . It has been noted that there appears to be a direct proportion between the size of a nerve cell and the number and length of its processes. This is justified in the present instance, for there proceed from these cells highly complicated processes, some of them of great length. From the apex of the cell a protoplasmic stem passes up through the superficial layers of the cortex and terminates in an arched arborescent panicle, each composed of plume-like expansions barbed with secondary spines. These panicles interlace with each other throughout the superficial layer of the cortex in the most intricate manner, forming a perfect forest of branches which, however, never anastomose with each other. . . . Besides the extraordinary appearance and peculiar situation of these cells there are reasons drawn from embryology and from comparative anatomy that indicate the probability that they are the chief agents in the psychic activity of the cortex. As we ascend the scale from the lower vertebrates to man, an increasing complexity of structure is found in these cells, and there is also seen a similar progressive development when the different stages of their growth in the embryo are observed. Ramón y Cajal has therefore given to these structures the name of *psychic* cells." *

As Dr. Baker intimates, the Spanish investigator lays it down as a general principle that the farther back we go in the ontogeny of the brain of mammals, that is, the younger the specimen is that is being studied, the fewer and shorter become the protoplasmic expansions, and that the same is true of their phylogeny, that is, as we descend in the scale of organisation. The following additional figure (Fig. 2)from the same sources will make this clear:

It is probable that the failure to make these important discoveries before is largely due to the fact that early investigators confined their attention chiefly to the brain of man or of the most highly de-

* "Tal es la disposicion de la célula piramidal de los mamiferos, de la que podríamos llamar, invocando su especial morfología y su exclusivo yacimiento en la corteza cerebral, *substractum* de los mas elevados actividades nerviosas, *célula psiquica*."—*Nuevo Concepto de la Histologia de los Centros Nerviosos.* Por el Dr. D. Santiago Ramón y Cajal. Conferencias pronunciadas en la Academia y Laboratorio de Ciencias Médicas de Cataluña en los dias 14, 18, y 19 de Marzo de 1892. Publicadas en la *Revista de Ciencias Médicas de Barcelona*, nums. 16, 20, 22, y 23, de 1892. Tomo XVIII, Barcelona, 1893, p. 27.

veloped animals and these at adult stages, in which the processes were much too long to be either successfully traced to their ultimate terminations or brought within the field of the microscope. And I may say that Fig. 1 represents a portion of the brain of a mouse at the age of one month. If it requires such a complicated brain structure to conduct the simple psychic activities of so humble a creature, what must be the structure required to conduct the psychic activities of a Newton or a Spencer!

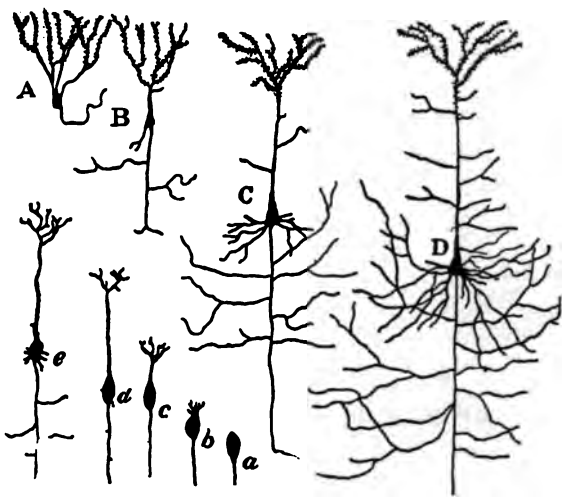

Fig. 2.—Phylogeny and ontogeny of the psychic cells (Ramón y Cajal). The upper series of cells shows the psychic cells shows the psychic cell in different vertebrates. A. Frog. B. Newt. C. Mouse. D. Man. The lower series shows the stages of growth that a single cell passes through. *a*, neuroblast with axis-cylinder process just commencing; *b*, panicle commencing; *c*, panicle and axis-cylinder process more advanced; *d*, collaterals of axis-cylinder appearing; *e*, collaterals of the cell body appearing.

Says Ramon y Cajal:

"As a final synthesis it may be affirmed that the human brain owes in great part the superiority of its activity, not only to the considerable number of its elements, but especially to the extraordinary richness of its means of association, that is, to the collateral branches of the axis-cylinders, the protoplasmic ramifications etc." *

It will thus be perceived that in all this we are dealing altogether and essentially with protoplasm and the mechanical means

* *La Cellule*, Vol. VII, Bruxelles, 1893, p. 172.

of enabling it to do the maximum work. Pyramidal cells, ascending processes, plumose panicles, axis-cylinders, and collaterals, all consist chiefly or wholly of protoplasm. Just as the essential thing in life is spontaneous movement, or motility, so the essential thing in mind is conscious sensibility, or awareness. These are the properties that distinguish protoplasm from all other substances, and upon these as foundations the body and mind, respectively, of all living things, including man, have been built up by the organising powers of nature.

COROLLARIES.

Two important corollaries flow from this monistic, and, as I must claim, only scientific theory of mind:

1. Conceived as a property, mind can present no greater "mystery" than that which is presented by any other property. If sensibility is, as it seems to be, only the necessary correlate or obverse side of motility, then the chief distinction between sentient and non-sentient bodies is that the activities of the former are partly molar instead of wholly molecular. No one can logically argue that spontaneous molar motion is essentially more mysterious than spontaneous molecular motion, yet no physicist or chemist any longer doubts that every atom and molecule of every substance, whether solid, liquid, gaseous, or ethereal, is in a state of ceaseless activity from an inherent motion of its own. This, however, though a known fact, is not regarded as a mystery. If the progress of development has been anything analogous to what I have outlined, if mind is a property of organised protoplasm, or if any such relation subsists between body and mind as subsists between other substances and their properties, then the question at once arises: Why not locate the "mystery" farther down in the scale, and cease to confine it to this one highest stage? For we are obliged to confess that the simplest qualities of matter are utterly inexplicable. We know just as much about why nerves feel and brain thinks as we do about why sugar is sweet or lead heavy. Even the simplest of all physical phenomena, those of gravitation, are utterly unknown to man except as observed facts and formulated laws. He is still as ignorant of why an apple

falls to the ground as he is of why and how he is able to see it do so. The attitude of awe and wonder before any of the phenomena of nature belongs to the childhood of the intellect and will be outgrown with its growth.

2. If mind is a property of body it is as inseparable from it as other properties are from the substances that possess them. It has no independent existence. In and of itself it is nothing. Like all attributes, it belongs to the category of relations, not to that of essences. The supreme fallacy of all philosophy has been that of treating mind as an entity.

It is, to say the least, curious, that it should fall to science to defend the immateriality of mind. It is still more paradoxical that it is this relational view of mind that is popularly looked upon as *materialistic*. If to posit a material basis for the phenomena of mind be materialism it were useless to attempt to evade the charge. But if the term materialism be employed in its only proper and legitimate sense as postulating the material nature of mind itself, the scientific conception of mind is the farthest remove possible from a materialistic conception. The antithesis between matter and property is absolute. Mere attributes are, in the clearest sense of the word, immaterial, and mind is simply an attribute. It would be as reasonable to insist that love, honesty, virtue, and liberty were material things as to say that feeling and thought are such.

If, on the other hand, we glance at the theory of mind that stands opposed to the scientific view, it is difficult to see how the charge of materialism can be escaped. If there is an element, call it mind, thought, soul, spirit, or what not, that can detach itself from the personality to which it normally belongs, and pass into another body, or remain in space performing mechanical operations upon material objects, it matters not whether it be visible or invisible, or whether it can appeal in any way directly to sense or not, such a thing possesses the nature of a material body, as much so as the invisible atmosphere, the rarer gases, or the vastly more tenuous ether that vibrates to so great purpose against the retina of the eye. Turn it as you will, twist it as you may, matter can only be affected by matter, and the impact of moving matter against other matter is,

in the last analysis, the essence of force. And this is true of the method which mind itself employs. Thought and feeling, in and of themselves, are powerless, nay, they are *nil.* They can only act through a motor system which uniformly and necessarily accompanies the sensor system, which transfers molecular nerve-vibrations to the muscles, transforms them into muscular movements, and communicates them mechanically to the world without. It is this that we mean by the term *expression*, whether it be of emotions or of ideas.

This view of mind has all the promise of a true science. Mind is a great power in the world. It has wrought mighty changes in the past and is destined to work still mightier ones in the future. An experimental psychology will place the laws of mind more and more within the grasp of man, even as experimental physics and chemistry have placed the laws of matter within his power. The opposite or ontological view, which I have shown to be essentially materialistic, merely represents the alchemy of mind. The self-styled "psychical researchers" are simply searching for the philosopher's stone. The same class have always been seeking it, and until late in the present century the whole domain of mind was in the pre-Baconian and mediæval stage. The baser metals of mind will be transformed into gold by the new science of psychology in the same way that those of matter were transformed by chemistry, and if the race of psychic alchemists, who imagine that gold alone has value, are disappointed with the result, the rest of the world will rejoice as it always rejoices when science triumphs over magic.

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THE UNITY OF THOUGHT AND THING.

"Philosophy tells us that the world is a picture which we ourselves make. There is nothing in the world, [including that object itself,] which we do not put there. Our whole life, then, is one creative process."

The above affirmation of monism and denial of dual subject and object is taken from T. Bailey Saunders's, M. A. (*Oxon.*), profound article on the "Origin of Reason," in No. 160 of *The Open Court.** It seems completely to bear out the scientific veridity of my title, and of Hylo-idealism, that on the apparitional, phenomenal, or relative theory of the universe, to which we have alone access, self is to self, further than which research is vain, the Be all and End all of sentient existence. Hence religion is seen to have run its baneful course and to be superseded by reason, on which Mr. Saunders so lucidly discourses. For if self be all in all there can be no room, in such a *pleroma*, for any *Latria* or worship, in the religious sense of the word, except Narcissus-like self-worship.

We are thus thrown back on, and face to face with, mere physical conditions, out of which *ideal* concepts proceed, while rigidly excluding all those misnamed "*spiritual*" ones, which hitherto have played so momentous a rôle in the destiny of humanity. We thus make hygiene, as defined by Dr. Parkes in the solemn introduction to his manual of that last (and first) of the sciences, as not merely bodily sanitation, though that is already much, but as supreme culture of mind and body, (or to be more scientifically precise, of body merely, including brain,) the all-sufficing surrogate of Divine worship. The old adage, *mens sana in corpore sano*, should thus read

*See also a lengthy and serious review of that able thinker's *Translations from Schopenhauer* in the London *Athenæum* for October 4, 1890.

corpus sanum=mens sana, merely. This *Volte face* turns every extant ethical and mental view *topsy-turvy*. As it must do by exploding "thing" altogether, and by substituting our own thoughts for objects of all kinds. It is true, or it may be granted, that there is an objective or distal *aspect* of subjective thought. But that fact, or admission, in no degree invalidates the position that the only objects cognisable are those incorporated with, and by, the subject self, from which all "things" proceed. This interpretation of the universe is, *inter alia multa*, that of the emancipated Baccalaureus in the second part of Goethe's "Faust," as enunciated in the lines:

> "I tell you this is Youth's [Man's] supreme vocation!
> *Before me was no world—'tis my creation:*
> 'Twas I who raised the Sun from out the sea;
> The Moon began her changeful course with me.
> I gave the signal on that primal night
> When all the host of heaven burst forth in light.
> Who but MYSELF saves Man from the dominion
> Of dogmas cramping, crushing, Philistinean?"

Indeed it is the very first and last principle of common sense and common place that before a "thing" is *perceptible* it must be made *sensible*, and where can sensibility lie except in the *sensorium* which manifests that property? On the ground alone of consciousness or sensation being a somatic office or function it can only be, like all other organic functions, an emanation of the self, and hence we are coerced into the conclusion that all things are but forms of the *Ego itself at once both Creator and Creation.*

This non-animism thus makes each unit of humanity all that has, in pre-scientific minds where absolutism and dualism is the watchword of the intellect, been predicated as *Divine.* Where reason, based on positive science, comes into play, or, in other words, when man ceases to be an infant, religion or theism disappears as a childish illusion utterly incompatible with right reason and rational ethics. All religious ideals and systems—none more than the Christian—are based on hideous immorality. For what can be more iniquitous than the doctrine of the Atonement, i. e., of the vicarious sacrifice of a sinless victim for a sinful criminal? But preceding this ethical *crux* is the logical fiction. For how can the Parthenogenetic birth of Christ redeem him from the primeval "curse" en-

tailed on all mankind by the mythical "disobedience" of our federal head and representative? From this "curse" virgins are no more exempt than their grandmothers, and thus, on its own *data*, Christianity is "hoist with its own petard." Indeed, a *replica* of Adam's abiogenetic "creation" would not serve, since earth and air partook of the "curse" entailed on our "first parents." No God is needed since man is seen to be an Autochthon and, as such, an Anteus, who derives all the faculties required for existence out of the telluric *matrix* or *humus* (living earth) from which he sprang.

As long as the absolute doctrine of dual existence vitiated philosophy—a dual factor, in the guise of an animating principle was, or seemed, a *desideratum*. But since the inductive biological theory, which defines life as the sum of the organic functions and a physiological state, was established, man can quite rest content in the satisfactory creed that he himself—each for each—is his own law, standard, criterion, and *final* court of appeal. Clericals of all denominations are then seen to be self-evidently "kicking against the pricks," when, in our *fin de siècle* age, they attempt to bolster up the obsolete anachronism of animism (dualism)—a quite impossible task, as I have before shown—from the incompatibility of two such factors as matter and what they are pleased to call "spirit" reacting on each other.

It is, I repeat, a case of pure fetichism or ghostism—the same in essence that induced the ancients to formulate their Lares and Penates, Dryads, etc., and in short, to feign a god, or goddess, for every phenomenon from Jove, launcher of the thunderbolts, to Cloacina of the sewers.

Pope, even, in his "Essay on Man," written many years after the appearance of Newton's "Principia," could not rid himself of the notion that "ruling angels" were required to regulate the spheres. And, long after Pope, poets invoked their muse as a source of inspiration separate from themselves! But, in our age, all such confusion of thought is a really inexcusable blunder which must, sooner or later, prove a Nemesis to that vicious civilisation which fosters so palpable a delusion.

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THE SUBJECTIVE AND OBJECTIVE RELATION.

A FOUR-FOLD CONSPECTUS.

> "The relation *between* subject and object should properly be called the subjective and objective relation."—*Reliques of Constance Naden.*

I. DUALISM.

IN the course of my reading, some years ago, I remember being struck with an admission on the part of a confessed dualist, the present occupant of the chair of logic in the University of Glasgow. The passage, which is as follows, occurs in a criticism of the views of the late Prof. J. H. Green, of Oxford.

"It may be said,—it seems to be assumed,—that the existence of a distinguishing self-consciousness is needed for the subsistence of the object perceived—for example, force in space. Now, I do not say that the mode of the subsistence of force that passes out of my perception is easily explicable, or explicable at all. Here, possibly, we may be face to face with the mystery—the insoluble mystery—of being." ("Knowing and Being," by Professor Veitch, LL.D. Blackwoods, 1889, p. 221.)

It seems to me that this admission involves much more than at first sight appears. Taken in connexion with the qualifications which immediately follow, it is the very key-note of *modern* dualism—a notable advance indeed upon the old-fashioned doctrine, though dualism still.

"But I may have evidence," continues the writer, "from experience—inferential proof—that the force or object does exist in some way or other, in a sphere transcending my perception. This, in fact, is the lesson of science in its simplest form." (*Ibid.*)

These are not the only passages of the same work in which such arguments are to be found. Besides "the insensible constituents

of the world in the form of atom, ether, corpuscle, along with, and involved in, the sensible," which, we are told, "are not and never can become objects of perception, that is, phenomena in the proper sense of the term," there are the varied relationships into which perceived objects may enter from time to time, there is (p. 72) "a nerve-current preceding actual or conscious sensation and perception by us, of which, at the moment, we are wholly unconscious," and still further, and, "beyond the organism or bodily sphere there are agencies in space which precede, condition, so far determine, our actual sensation or perception, of which, however, we have neither sensation nor perception."

And because all this cumulative evidence goes, apparently, to prove that, beyond the individual organism, or at least on its outermost confines, there exists a group of facts which cannot be regarded as egoistically "constituted," the conclusion is sought to be reached that the order of nature is dualistic. Yet, as we have seen, the argument halts a little at one stage. "I do not say," is the expression of Professor Veitch regarding one portion of its basis, that it is "easily explicable or explicable at all." Ethereal vibrations and undulations *preceding* perception—anticipating the percipient as it were, and therefore surely independent of him, are plain enough from the standpoint of dualism. What is *about to pass into perception* is granted, but the subsistence of that which *passes out of perception* is perhaps inexplicable! Upon what principle is this theory based? Surely upon one itself inexplicable, were it not that a further quotation shows confusion of thought to be at the root of the matter. The words italicised point clearly enough to oscillation in the viewpoint.

> "We distinguish ourselves from the object or percept. . . . Are we entitled on this ground to say that its whole reality is identical with its perceived reality? That it may not subsist apart from the time of our perception, *either as it is, or in some form capable again of appearing to us as an object, even an object similar to what we now perceive?*" (*Ibid.* p. 200.)

Professor Veitch combats the Oxford Professor's contention that the ego of consciousness "constitutes" nature, or the external world. But he seems reluctantly to admit that once anything ex-

ternal has passed through consciousness, e. g. experienced force, the said force is never the same again as it was before. *A B C* . . . successively passing through the point of consciousness are normal and intelligible up to that point, but once they have emerged from it their subsistence becomes "not easily explicable if explicable at all," hints, in fact, of "the mystery—the insoluble mystery of being."

Now, the ego is either (in Professor Green's sense) constitutive or it is not constitutive. It matters little, at this stage, in what special sense the ego is regarded. Either the former or the latter alternative must, however, be true of it. If the former—if it *is* constitutive—then it is surely capable, if not of accounting for succeeding phenomena, in which case the dualistic argument fails. If the latter—if the ego is *not* constitutive,—then it influences neither preceding nor succeeding entities, and there is nothing "inexplicable" at all!

This advanced view on the part of the author of "Knowing and Being" does not, however, characterise him throughout. Along with it, he professes thorough-paced dualism of the older type—and answers the question "Why does the intelligence make different relations?" with the characteristic statement: "On no reasonable ground but on that of a known order, which it does not create, but which informs and illumines it" (p. 141). With him, the perceived object in the moment of perception is, of course, related to the subject, but he insists repeatedly that this relationship may be but temporary and accidental, and, above all, that even to admit that an object is so "constituted" is not to dogmatise as to the *sole being* of that object. Significant indeed, are expressions such as the following: "a conscious or spiritual subject, continuous in time, exercising a synthesis on an order of facts, for purposes of knowledge," and this again, "the singular, indivisible unity of the subject, one in the midst of the passing terms" (p. 235–236).

The principal point, however, to be noted here is, that, at the same stage of the argument does the selfsame difficulty present itself to dualist (as represented by Professor Veitch) and to monist (as represented by Professor Green) alike. What the resource of

transcendental monism is, we have yet to consider. But the *modern* dualist finds himself landed in difficulties at precisely the same point. To the dualist it is, of course, of no moment—it is rather a distinct advantage—that the subject should be shown to rise superior to the series of contemplated objects—though the same admission is really fatal to monism. But—and here lies the *crux* of dualism—although it is not only permissible, but essential to this view to regard objective facts as, somehow, existent prior to the instant of perception, it is no less fatal to it to be compelled to define, either (*a*) the exact mode of their subsistence (e. g., in the case of force) when the selfsame time has passed, and the object, once in the field of perception, has quitted it, or, (*b*) the qualifying effect of the subject (for it must surely amount to something) upon such an object. If as *stimulus* such an object existed prior to perception, must it not as stimulus subsist afterwards? which would be an awkward conclusion. The explanation of all this probably is that modern dualism, being plain dualism no longer, is compelled to "hedge" and finds itself in difficulties accordingly. After all, the main difficulty is not wholly novel. "Teacher," inquired a latter-day pupil, watching his preceptor setting a sum on the blackboard, "Teacher, where do the figures go to when you rub them out?"

It is all very well to appeal to "science" for an argument against Professor Green's position, and to point out that, say, water, cannot be said to be "constituted"—at least, in its totality—in the moment of perception, seeing that the "surface properties" of clearness, fluidity, etc., which alone are then patent, do not "make up" the object in its entirety—the insensible constituents—oxygen and hydrogen (which, as dualism triumphantly asserts, go to make the water *what it is*, and without which it *would not have been at all*)—being altogether omitted. This is so far telling, though the weak point of the argument is not difficult of discovery. But, when it is sought to be impressed upon us that the "stimulus" of light and sound sensation similarly precedes, necessarily, the sensation itself, and dualistic capital is sought to be made out of the statement, the ground is not so certain. The field is shifted from that of "gathered knowledge" to that of purely subjective hypothesis. It must

be remembered that the cue of dualism does not consist in showing that perception is a complicated process. No one denies *that*. Its very foundation, an the other hand, is shaken if it cannot be demonstrated that *throughout* the cosmos a boundary line exists, capable of verification everywhere and at all times. Otherwise dualism perishes. This separation must be drawn throughout the realm of facts, verifiable facts only. And that is an impossibility, if for this reason alone, that, on the ground of physics, a subjective-objective separation throughout would lead to atomic divisibility, and the region of hypothesis is invaded, where your dividing-line is drawn according to the dictates of fancy alone.

Here is a subject-object relation admittedly fortuitous and temporary.

II. TRANSCENDENTAL MONISM.

This section need not be a lengthy one, if for this reason alone, that the chief difficulty of advanced dualism upon which we have just dwelt, is the opportunity of the first stage of monism.

Since the time of Hume, when the permanent conscious subject was dispensed with, in favor of a "string of impressions illegitimately bound together in a series," the apparent need of philosophy was a "something," in which the series of impressions, as a series, might inhere. That this "something" could not well be the individual consciousness, as a subject, was sufficiently evident to the monists. For, once place the individual consciousness in the needed position of superiority over, or aloofness from, the impressional series, in order that it may not only reflect,—mirror-like,—the terms of the passing series, but, at the same time, synthesise them into a connected whole, and you at the same time admit a dualism.

There was, indeed, a twofold difficulty, arising from timal exigencies. There was (1) the objection, urged by dualism, that *prior* to the conscious impression there was a natural process—certainly not subjective—say of undulation or vibration of ether, without which sensation could not possibly happen. Time being a factor in the situation, how could the conclusion be avoided that here was an

apparently unconnected entity, separate from consciousness? And then (2) there was the added difficulty, that no passage of the several impressions *a*, *b*, *c* . . . . through the point of consciousness, could give more than what the several impressions individually were —a record of each successive impression, but no record of the gathered synthesis. The twenty-four hours might pass over the dial, but the faculty was wanting to sum up the result into the total of one day.

This pure thinking subject, "other than the events, and not passing with them," must evidently, if it is to be equal to the occasion, be itself timeless,—"imposing, but not submitting to, the conditions of time and space." Hence the origination of the Eternal Consciousness of the late Professor Green. "The analogy of the perceiving consciousness is transferred to the universe or universe-consciousness, and, as perceived, reality is simply relation in time by a subject out of time; so is all the reality of the universe. There is a (or one) consciousness, or self-distinguishing subject, for which the relations or facts that form the object of our gradually attained knowledge already and eternally exist. . . . This is the eternally complete consciousness."

This is what has been called the method of transcendental abstractionalism, for besides the importation into the matter of a transcendental ego—subject and object in itself, as holding the universe fact in solution—the operation has been facilitated by what may be called the abstractionalist view of the individual self. In a word, thought, and not the thinker, is dwelt upon,—consciousness, and not the conscious subject. In this way it is easy to pass to the position of holding this transcendental self to be real—in fact, the only reality—instead of, as with Kant, a logical abstraction, and, finally, to its elevation to a theistic level as a substitute for the God of popular theology. As Professor Veitch puts Green's position ("Knowing and Being," p. 30).

"It is as we relate, according to the relations of the eternal consciousness, that we reach the truth of things. This is an infinite fount, or, better, reservoir, of timeless relations, which pours life into the human consciousness in time. It is the condition, not only of knowledge, but the creator of reality."

This Neo-Kantian theory, as it has been called, differs from the ordinary subject-object presentation of dualism most markedly in the following respect. It seeks to blend percepts with concepts—or, rather, to recognise nothing in the former which is not in the latter. It seeks to include all outward, or so-called external, reality within the domain of thought. Thought being thus supreme over the objective, the thinking subject disappears in the same mist, and the abstraction of the infinite consciousness alone remains. This is monism, indeed,—of a kind.

In this aspect, the subject-object relation altogether disappears by fusion in a transcendental entity, which, so far from preserving the relation within itself, is only a means of its obliteration.

III. MONISTIC POSITIVISM.

This view is ably expounded by Dr. Paul Carus in his works "Fundamental Problems," "The Soul of Man," etc., (The Open Court Publishing Co.), and in the pages of *The Open Court* and *The Monist*. In it we find a presentation of the subject-object relation radically different from either of the foregoing. But Dr. Carus can best describe his own method.

"Positive philosophy rejects all kinds of postulates, and starts from the positive data of experience. The data of experience are the several states of our consciousness. The elements of our states of consciousness are sensory impressions. A sensory impression, fully realised in consciousness, is a sensation. Sensations become percepts; many percepts of the same kind become concepts. Thus all the objects of our surroundings are mirrored in their relation toward us, and among themselves, in the living substance of our brain" ("Soul of Man," pp. 374–375).

Now, with a reservation to be afterwards noted, this is much more than an initial step in the right direction. The dualism which we have examined professed much the same intentions to start with, but did not keep its promise—its system of research being vitiated, at the very outset, by a foregone conclusion—the separation, namely, of subject from object. This separation is implicit, if not explicit in its proposal ("Knowing and Being," Intro. p. 1) to begin with the twofold questions to which its philosophy is to supply the answers—viz. "What do I know?" and "What is?" In the shaping of these queries a separation is taken for granted, at the very thres-

hold of inquiry, between knowing and being. How has it been ascertained, at this stage, that knowing and being are different spheres? Why, at the outset, is it assumed that that which exists so divides itself? But we turn to Dr. Carus. Take the following extracts as samples:

1) "All elements of objective reality are inseparably united with the corresponding elements of subjective reality, and the latter are those facts which under special conditions, and in special combinations, unite into feelings" ("Soul of Man," p. 7).

2) "Feelings must be considered as a complex of certain elements which we call 'the elements of feeling'" (*Ibid.*, p. 6).

3) "The world is as it is, one indivisible whole. All its objective reality is throughout combined with subjective reality. The objective reality we call matter, and its activity, motions. The subjective reality we call elements of feeling; and the compounds resulting therefrom are actual feelings and consciousness" (*Ibid.*, p. 10).

4) "If neither matter nor motion is to be considered the one as the basis of the other, reality, as it exists in itself, may be conceived as a great interacting something, in which the effects of all the surrounding parts upon one special part, an atom or a monad, in so far as this part is concerned, appear as what we have defined as an element of feeling; while the effects of this special part, of every atom or monad, upon the rest, in so far as the totality is concerned, appear as motion" (*Ibid.*, p. 14).

5) "The whole domain of mind-activity (i. e. of the representativeness of feelings) is called subjective; while the totality of all facts that are represented in the mind is called objective. . . . Subjective existence constantly draws upon objective existence. . . . We distinguish between our body and external facts; but the boundary between both provinces is not distinct. There is constantly an exchange of substance taking place, proving that our body is in kind not different from the substance of which external facts consist. It must be regarded as a group of the same kind as external facts, existing in a constant interaction with, and among, the external facts. In other words, the body of the thinking subject is an object in the objective world" (*Ibid.*, p. 25).

6) "The data of knowledge are not mere subjective states, they are relations between subject and object. Neither the subject is given, nor the object; but an interaction between subject and object. From this interaction we derive by a very complicated process of abstraction both concepts, the subject as well as the object. It is true that the subjective world of feelings, and of representative feeling, is very different from the objective world of things. Nevertheless they are one. The subject, together with all objects, forms one inseparable whole of subject-object-ness" (*Ibid.*, p. 36).

Should the above brief conspectus of quotation fail fairly to present Dr. Carus's philosophical view-point, it must be remembered that this paper is only concerned with the subject-object relation, and only with such part of each reviewed system as if concerned with the said relation. Of course, as a vital point in every philosophical system the treatment of this portion fairly indicates the drift of the whole. Only it must not—this partial survey—be mistaken for a complete exposition. Considerations of space alone would prevent any such attempt.

Monistic positivism shows no lack of logical thoroughness. It is distinguished by much acumen, and, from its constant consultation of physical data, is readily verifiable, from time to time, by the student. Whether or not it is a completely successful *rationale* of the subject-object relation, within the limits of a consistent monism, is another matter. Probably its author would be the first to deprecate its being classed as final, or as not amenable to correction. This correction, however, it is not always easy to make, or even to suggest. It is proverbially difficult to alter successfully another person's work, and the difficulty is greater when the theme involved is one of the vexed problems of philosophy. There is the risk, again, of misunderstanding the terminology employed, even by a writer so precise and accurate as Dr. Carus. But it may be allowable to state briefly some of the points in respect of which monistic positivism, in regard to the matter now at issue, seems to fall short of a true unification.

Let us look again at the above quotation (p. 36), "Neither the subject is given, nor the object; but an interaction between subject and object." If by this is meant that the sensation, say of color, is the result of an interaction between vibratory ether and the optic nerve, the statement is correct. But how about the "projection" of this into the objective world, concerning which Dr. Carus treats ("Soul of Man," p. 30). The projection in question is comprehensible enough in the case of the illustration there given—a printed page, which, as a given fact, is the sense-impression of a white rectangle covered with little black characters, and, as the corresponding inferred fact, a sheet of paper. Is a colored surface, then, the cor-

responding inferred fact of the simple color which is the given fact? Be this as it may, the same objection, urged by dualism against Professor Green, will avail against monistic positivism. For "the interaction" is not everything. There is something which precedes it in time. There is the ethereal vibration which anticipates consciousness, sensation, perception,—which necessarily precedes all this. Now, what precisely *is* this vibration? Subjective? Then, to quote Dr. Carus ("Soul of Man, p. 27), "The elements of the subjective world are features that we must suppose to be inseparably united with the elements of the objective world, which are represented in our mind as motions." But this vibration, prior to sensation, is not represented in any mind. Is it objective? Then, again, "All elements of objective reality are inseparably united with the corresponding elements of subjective reality" ("Soul of Man," p. 7). But the vibration in question is not yet united with any subjective reality, or element of such, therefore it cannot be itself objective, or an element of objective reality. And, as it cannot be an "interaction" between subject and object, seeing that no interaction has yet taken place, what can it be?

And the question goes deeper still.

"The presence of the elements of feeling must be supposed to be an intrinsic property of the objective world" ("Soul of Man," p. 27). But at what stage? For we read (p. 26), that the subjective world is "transient"; the objective, "eternal, indestructible." Thus the conclusion is irresistible that, until such time as the conditions of development of subjective feelings arise—until potentiality develops into actuality, the objective exists without any subjective counterpart. As the objective cannot be said to form an interaction with its own potentialities, or "intrinsic properties," how can we say, again, that neither the subject is given, nor the object, but an interaction between them?

Further, it is not plain what *rationale* Dr. Carus gives regarding the mode of the subsistence of force, passing out of perception. All is clear so long as a subject is ready to form an "interaction" with the objective, but nothing seems to be provided for the contin-

gency of an entity—objective or otherwise—either *preceding* or *succeeding* the subjective in time.

Let us examine another passage—italicising some notable words :

"Truth in one sense is objective; it represents objects, or their relations, conceived in their objectivity, in their independence, of the subject. This means that the representation of certain objective states will, under like conditions, agree with *the experiences of all subjects, i. e. of all feeling beings* having the same channels of information." ("Soul of Man," pp. 41–42.)

How are "the experiences of all subjects, i. e. of all feeling beings," to be arrived at? Are not all feeling beings—other than self—upon the same objective level to me as other objects? If so, how can such "ejects," as are here referred to, compare with my own proper subject-object experiences?

Perhaps it is owing to an imperfect understanding on the present writer's part, of the system of monistic positivism, but the following is surely irreconcilable with the severity of monism.

"Mind, or the representation of facts in feeling substance, is the creation of a new and a spiritual realm, above the facts of material existence. By spiritual we understand feelings that are representative; and we say that it is a new creation, because it does not exist in the isolated facts of the world. It is formed under certain conditions. It rises from certain combinations of facts; being built upon those facts which produce, in their coöperation, the subjective state of feeling." ("Soul of Man," p. 42.)

If there exist isolated facts, their existence *plus* a new and spiritual realm, or new creation, contradicts the statement, already quoted, that "the world is. . . . one indivisible whole." No combination of already existing facts can make anything properly "new." Nothing can issue, from thus ringing the changes, which was not there before at least potentially, and the development of potentiality into actuality, though it may involve the novel, does not, in a philosophical sense, imply the *new*.

All this, as it seems to the present writer, is the result of an erroneous method of inquiry. A philosophical inquiry into the precise nature of the subject-object relation should start from the individual, personal consciousness tracing, step by step, how much

this includes, and, only when this has been ascertained, should the search be prolonged,—if it is to be prolonged,—into other fields. It seems, in monistic positivism, as if this rule were not adhered to; the testimony of the individual, personal consciousness is indeed appealed to, but only incidentally, and the line of research is diverted without notice, and, as if the two methods were one and the same, into the region of experimental physics. A subjective inquiry, which alone can inform of the subject-object relation, is shifted for purely objective exploration. Now, it is idle to search for the subjective where it does not reside, and in the exploration of nerve and tissue for the *rationale* of subject-object relation the experimenter is dealing with the object alone, *plus*, of course, *his own* subjectivity, which, in this instance, is beside the mark. In other words, objectivity (not ejectivity or inferred thoughts of "other thinking beings," all of whose thoughts are on an entirely distinct level), coupled with my own, proper subjectivity, gives the relation sought. But in objectivity alone, or coupled with inferred thoughts of "other thinking beings,"—that is ejectivity,—the junction, say in brain localisation and nerve differentiation, is nowhere to be found. The desired relation, the only true subject-object relation—must be found at first hand.

In monistic positivism the subject-object relation is presented in a clearer and more consistent light than by either of the former systems. But as, to a certain extent, the relation is represented as obtaining in a potential form, the basis, to that extent, is insufficient.

IV. AUTO-MONISM.

Now, does it not seem after our brief review of the foregoing systems, as if, in connexion with the subject-object relation, something curiously similar is lacking in all? Dualism halts at the stage when force, passing out of perception, has nothing "easily explicable, if explicable at all," wherein to subsist. This difficulty is attempted to be met, in transcendental monism, by the expedient of handing over the force in question to a consciousness, which turns out to be not properly egoistic at all, but common to all the individuals of the human race—thus slurring over the individual subject

altogether. Monistic positivism again has need of something wherein more than the mere potentiality of subject-object interaction may reside; wherein, again, to unite the, apparently varying, individual "centres of representations" into a veritable cosmical ego, accounting, in itself, for all, apparent, timal discrepancies.

These *lacunæ* are filled by auto-monism. But I use words far clearer than my own to express this truth of truths.

"What we know as the external world is composed of colors, sounds, tastes, touches, and odors; and since these can have no existence prior to their birth in the sensory ganglia, we see clearly that every man is the maker of his own cosmos It comes into embryonic existence with his very first gleam of conscious life, and develops with his development, as he gradually learns to combine its lights and shades into symbols of form, size, and distance, and to indue its varying tones with relation and significance; it becomes less vivid with his decline, and, at last, dies forever with his death. As soon as the perceptive organs have laid a foundation for memory and comparison, the present is supplemented and explained by, the past; and the union of the two renders possible a new cosmos of emotion and intellect, which obeys the same organic laws of growth and decay." ("Further Reliques of Constance Naden," London, Bickers, pp. 120–121.)

This is the one side of the binomy; take this in connexion with the other side as follows, and the *rationale* of auto-monism (Hylo-Idealism) is evident at once.

In answer to the question "What is the true starting-point of philosophy," Miss Naden writes:

"This question need not detain us long. . . . For, if subject and object be indissolubly one, the simplest unit from which we can start must be the ego in its entirety; that is, the universe as felt and known." ("Reliques," p. 152.)

And again:

"For the philosopher who deals with the universe as a synthesis, the self, or ego, is that same synthesis, including all the various relationships of self and not-self which can be set up in thought." (*Ibid.*, p. 154.)

In a notice of the essays of Miss Naden, from which the above extracts are taken, contained in *The Open Court* (Feb. 11, 1892, No. 233, p. 3142) the following passage occurs:

". . . . to argue from the identity of the cosmos to the identification of the cosmos with the ego, as Miss Naden does . . . . appears to us unreasonable."

Well, the argument is simply a prolongation of the assurance

of self-consciousness through the limits of the universe. The dividing line, upon which monistic positivism so strongly insists—say between given and inferred facts—does not militate against the conclusion arrived at, when it is considered that this line, so far from implying virtual separation, only gives us units isolated in thought. The synthesis is the true unit—being the only unit which does not imply anything else, which every *fractional* unit of the universe-synthesis does.

Observe how auto-monism supplies the gaps of the systems already treated of:

1) The need of "something" in which a percept, say force, may subsist when passing out of consciousness, is a mere begging of the question in favor of the separation of subject and object. How do I know that the force in question is a thing "outside" myself proper? Dualism indeed tells me regarding it, "This force is opposed to me in every way, to my will, to my muscular effort, to all my power. It is beyond me in space—in opposition to my personality. It is as distinctly something not belonging to me as anything that can be conceived." But the self here—the *I*—is that of the limited bodily organism, part and parcel, however, all the same of that which it experiences. Otherwise how is it that dualism itself finds its mind clouded with a doubt? As we have seen, it cannot trust this force, though "not belonging to me" out of sight for an instant after passing out of its perception.

2) Similarly transcendental monism is puzzled because it cannot find something "other than the events and not passing with them," unless it is permitted to erect a timeless consciousness to hold the events in solution. Well, the required consciousness need not be sought for far away—since an egoistic, cosmical synthesis includes both it and the events. The dividing line is only set up in thought.

3) The supplementing of monistic positivism is more complicated, but may be expressed thus: (*a*) As we understand Dr. Carus, the elements of feeling, being at least potentially present in the objective world, such may at any time develop into the subject. There is a timal difficulty here again. Inasmuch as, at all events, the be-

fore and after of this development of potentiality have to be reckoned with. A time when developed subjectivity faces objectivity has to be defined apart from a time when it did not. Here again is an *impasse*. What factor introduced causes this change? Auto-monism, identifying subject and object by including them in a synthesis, whereby the relation between them is only set up in thought, has no such difficulties to face. Subject and object are coterminous, neither before nor after the other, now and always. Further, (*b*) the auto-monistic synthesis is the only universal one, as no outside world of things can possibly differ from the inside representation—there being no outside possible for the auto-monistic consciousness. Other selves are not outside; they, with their respective "ejects," are part of my individual self. No appulse, or outside stimulus, is really think-able, as external. It is part of the cosmos which, spider-like, I spin from my internal self. And, when I image such externality, I but create it.

To put the foregoing in a nut-shell. The inexpugnable *I* of consciousness, guaranteed to us by the necessity of thought, is, in the systems of dualism and transcendental monism, to be found *in part only* of the universe; with the monistic positivist this *I* (the creation of circumstance and groupings) is *anywhere* in the universe. Auto-monism reveals the self-same *I* as *everywhere* in the universe.

The theories and concepts of modern physics are a budget of paradoxes *minus* a something in which they may consistently inhere. Hume's need of an individual and simple something, as a link between isolated impressions, is also a latter-day need. An atomic theory, with the subject *contra* object theory prolonged into it, is a tissue of contradictions. The push and pull of particles flatly contradicts the axiom that nothing can move, except in the place where it is. The *stimulus* theory of vibration needs a similar stimulus behind, and stimuli behind that again, in endless regress, if it is to advance a step beyond the purely hypothetical—"a convenient representation of the unknown." All this resolves at once on the "open sesame!" of auto-monism. Atom, vibration, undulation, mutual attraction—all these *are not*, save as I shape them, and, in the last recess of philosophy, as in the extreme limit of physics, *I*

am, and there is none else. "The cosmic systole and diastole are one with the pulsing throb of my own egoity."

But, apart from the hypothetical bases of physics, there is to be found in its elementary text-books, a group of what may be termed sub-surface facts—totally irreconcilable with any other *rationale* than an auto-monistic one. As they are perfectly familiar to the ordinary student, to mention them will suffice. There is the inversion of the retinal image, which, notwithstanding Kepler's *rationale*, and some more recent explanations, would be perfectly inexplicable—as much so as a thing being and not being at the same time—did we not recognise that the thing seen is *as it is seen*, and not otherwise, and that any subsequent positing of it, as existing differently, is only a secondary, not a primary, process. That the one is object, the other, as it were, "eject," or, to put it still more plainly, that the contradictory image stands in the same category as the imagined "difficulty." Then there is the "projection," as it is called, of subjective facts into the so-called "external" world. Were this projection an actual primary fact, and not a secondary inference, no ingenuity could prevent the conclusion, that the thing, wherever or whatever it is, exists doubly; first, as it exists internally, and, second, as it is projected externally—nor could the difficulty be got over by the use of such metaphors as the substance and its shadow or reflexion. In a philosophical sense, the shadow is as veritable an existence as the substance, both being *real*. But "internal" and "external" signifying the same in auto-monism, no difficulty exists. The use of these terms should be carefully defined. In the crude sense of dualism, "internal and external" are fictions responsible for most, if not all, of the "blind alleys" of modern physics. Their existence as stumbling blocks should, and doubtless will, pave the way for a theory which disposes of them by reduction of all such ideas to their rational level. If the "outside," or objective, world of things really existed, fronting the percipient, would not the rods and cones of the bacillary layer of the retina—those prime factors of vision—be directed, like a series of telescopes, *towards* this supposed object? As a matter of fact, they point quite the other way, viz., downwards and backwards! All retinal impressions are "referred"

to a position vertically opposite to the point of irritation—vertically opposite, and outside the body. Why is this? Is it because they really exist there, externally? Scarcely, except in thought,—otherwise the *phosphène*, a luminous image produced by pressure on the eyeball, and similarly referred to an outside position, exists there also. And if not in the latter case, why not? The very hornbooks of physical science abound in these puzzles, born of the subject *contra* object delusion, and to be solved only by means of auto-monistic reasoning.

In this system, in contrast with all of the foregoing aspects, the subject-object relation is neither accidental nor temporary, but is permanent and universal. The proper aspect of relational terms is preserved, not obliterated. The aspect is always that of actuality—never of mere potentiality—each term of the relation being coterminous. The unity of the terms is guaranteed by their interdependence upon each other, the object implying the subject, and *vice versa*. And the relational unity, being internal, is complete, any external relationship of the auto-cosm being impossible in thought.

G. M. McCrie.

MONISM AND HENISM

WITH SPECIAL REFERENCE TO DR. R. LEWINS'S AND MR. LESTER F. WARD'S MONISTIC THEORIES.

THE terms monism and dualism are not yet two centuries old; the former was invented by Christian Wolff as a contrast to the latter, which, according to Eucken, appears first in Thomas Hyde's book "Historia Religionis Veterum Persarum," 1700, as a designation of Zoroaster's religion. In the same sense, dualism is used by Bayle and Leibnitz. But Wolff applies the term generally to any theory that reduces existence to two independent substances, while monism to him is that doctrine which takes the unity of existence for granted. Wolff rejects monism and classes himself among the dualists.

The word monism dropped out of use until Hegel adopted the term to characterise his system. It was again forgotten when Hegel's influence subsided, only to be reintroduced by Darwinians like Haeckel and a constantly increasing class of philosophers, who believe in the unity of being and reject supernaturalism of every form.

In the meantime we have discovered that monism is a very old theory, that, for instance, Spinoza is a very strong monist, and that monism, indeed, is the aim and ideal of all philosophising. At present almost every philosopher claims to be a monist: spiritualists like Carl Du Prell, materialists like Ludwig Büchner, and agnostics like Herbert Spencer. Professor Veitch of Glasgow is one of the few exceptions who openly confess themselves dualists. Even theologians yield to the need of unity in thought, which so powerfully asserts itself; and it is becoming more and more apparent that all

the old orthodox ecclesiastical philosophers, such as Augustine and Thomas Aquinas, were monists, in the sense that they really endeavored to view the world as a unity. The dualistic schoolmen were always among the opposition, and their systems found little favor with the official representatives of church-traditions. The sway of monism is so strong that we might almost say the issue is no longer between dualism and monism, but between the various forms of monism. Our philosophers have, upon the whole, acquiesced in the conviction that a unitary view of existence must be reached; the question alone remains how we are to realise oneness and where we shall place the centre that is to give character to our philosophical systems.

What is monism?

Webster defines monism very inadequately as:

"That doctrine which refers all phenomena to a single ultimate constituent or agent."

The definition of the Century Dictionary is more involved but not better:

"Any system of thought which seeks to deduce all the varied phenomena of both the physical and spiritual worlds from a single principle; specifically, the metaphysical doctrine that there is but one substance, either mind (idealism) or matter (materialism), or a substance that is neither mind nor matter, but is the substantial ground of both."

There are, accordingly, two kinds of monism. Some understand by it a one-substance theory; again, others, like Mr. Lester F. Ward, say that "the term monistic implies a single principle." Not satisfied with any of these formulations we propose the following definition, which will probably be acceptable to all monists:

"Monism is a unitary world-conception."

Whether or not the world-substance is one and the same throughout, is not a philosophical, but a physico-chemical, problem. We believe that it is one and the same, but should not recommend a statement, the truth of which must be decided by the investigations of the special sciences, as a basis upon which to found a philosophical system. Whether or not there are agents or ultimate constituents of reality which have to be regarded as distinct from their actions, is a metaphysical question into which we cannot enter here. Suffice it to

say that their assumption is of no use, and far from constituting a monistic view would imply an irredeemable duality in the system of the world. Whether or not everything can be reduced to a single principle is, to say the least, very doubtful.

If monism were not a more comprehensive term than its definitions as a one-substance theory, a one-principle doctrine, or a one-agent hypothesis imply, it would scarcely exercise so great a fascination upon minds of such various dispositions and contradictory convictions as it has.

In defining monism as a unitary world-conception, our intention is to make prominent that feature of it which appeals so powerfully to all thinkers. Monism, or a unitary system of thought, is the universal ideal of philosophy. Monism, in a word, means consistency.

It is incompatible with the nature of thought to accept at the same time two contradictory ideas as true. There is a oneness about truth which admits of no equivocation. There may be two or more truths which differ from one another, but there cannot be two truths which contradict each other. When confronted with two well-ascertained statements that do not, on their face, agree, we stand before a problem, which is solved only when we effect an agreement. It may be, that either the one or the other, or both, represents only a partial truth. Although not wrong, each statement, by itself, may be imperfect, and the complete truth may appear only in their combination.

A thinker cannot help searching for unity of thought, and this, we should say, is the subjective condition of monism. Moreover, man's yearning for a unitary world-conception is fully justified; for science itself is nothing but the endeavor of unifying knowledge. The very nature of scientific problems, in fact, may be characterised as an inability of ours to comprehend two different facts under a single formula. Every solution of a problem represents a triumph of monism. Our ability of viewing two apparently heterogeneous sets of phenomena as actuated by the same law under different conditions is an evidence in favor of the hypothesis that the actions which take place in the world of objective existence exhibit the same consistency which our mind naturally expects them to possess.

Monism, in this sense, is the ideal of all philosophies, and dual-

ism is nothing but a frankly acknowledged despair of ever establishing a unitary view of existence. Dualism is always, or in the end must lead to, either agnosticism or mysticism, for dualism is equivalent to a confession that we are, and shall always remain, incompetent to reach a consistent conception of ourselves and of the world in which we live. Problems are considered as unsolvable or inexplicable.

The monistic ideal of a unitary conception of the world has been constantly corroborated by the progress of science. We are far from maintaining that all problems have been solved, but we declare that wherever science has made indubitable progress, such progress has consisted in some further realisation of monism; and we cannot even conceive of an advancement of science that should be of a different nature. Whenever a scientific discovery seems to point towards a dualistic world-conception, it must be regarded as an unsolved problem, until the dualism is overcome. Monism is different from other philosophical views in so far as it is not so much a finished system, as a systematic plan constantly admitting of improvement, of corrections, additions, and perfections. It is the solution of certain fundamental problems of a general character employed as a method for further inquiry into questions of detail.

Dualism has been, and is still, very strong; for it has a natural basis: It rests upon the observation of the difference that undoubtedly obtains between mind and matter, soul and body, spirituality and sense-experience. But the mere recognition of these differences, in itself, does not constitute dualism. If it did, our own view would have to be classed as dualism. On the contrary, dualism, as we understand it, is the surrender, as hopeless, of all attempts to conceive body and soul as an intrinsic unity. Recognising the heterogeneity of spirit and matter, dualism jumps at the conclusion that they must be regarded as distinct entities, which by combination produce our existence, such as it is.

Dualists are rash, but there are monists who outdo them in the acceptance of unwarranted conclusions. Many monistic thinkers, in their eagerness to reach a unitary conception, simply drop either body or soul, matter or mind, spirituality or sense-experience and

deny its reality. They are satisfied with a one-sided unity reached by shutting their eyes to everything that threatens to introduce duality.

Yet, whatever their claims, doctrines whose unity of conception is due to a limitation of thought to a single aspect of the world, cannot be classed as monism ; they are pseudo-monistic, and to distinguish them from true monism, we propose to call them *henisms*, or single-concept theories.

There are mainly two kinds of henism ; the one which eliminates the reality of mind is called materialism, and the other which eliminates the reality of matter is called spiritualism. Yet as there are many dualisms, so there are many henisms, which approach with varying degrees the common ideal of a true monism.

The unity of henism is not genuine, but artificial ; and it is obtained by wrong methods. The monistic ideal of henists is conceptual, not real. They take one idea, be it spirit or matter or the unknowable, and make it embrace everything that exists, or reduce all events to mere properties or functions of this all-sufficient substance.

The present number of *The Monist* contains three articles by prominent thinkers with whom we agree in the rejection of dualism without being able to adopt their formulation of monism. I will not positively say that their views should be called henism and branded as pseudo-monism, but I find great difficulty in tracing in their terms and views the consistency that is needed to establish a truly monistic philosophy. Their monism, if it be monism, is not unequivocally expressed, and a reader is apt to misconstrue their intentions.

It is natural that the following remarks, which present our reasons for disagreeing with Mr. Lester F. Ward's and Dr. Robert Lewins's monistic views, will appear in the shape of criticisms. They are, however, written in the hope that the intentions of these authors agree better with my propositions than their words. Nor is it necessary to add that a difference of opinion does not prevent us from recognising the great abilities of our esteemed contributors.

* * *

Mr. Lester F. Ward promises in the title of his article "a monistic theory of the mind"; he comes to the conclusion that "mind

is a property of body," and claims that this is "the only scientific theory of mind." With all deference to the scholarly accomplishments of Mr. Ward, I cannot discover that he has either redeemed his promise and proved his conclusion, or made good his claim. Indeed, the subject of his title is scarcely touched upon. Mr. Ward speaks of matter and its functions, of organisation, of protoplasm and its qualities. He quotes some interesting passages on recent physiological discoveries and shows us two diagrams of Ramón y Cajal; but nowhere does he give us an explanation or description of mind, and we remain quite ignorant of how it is possible that matter can have such a wonderful property as mind.

Mr. Ward's method is not scientific, but dogmatic. He does not start from the facts given us in experience, but constructs a theory. He begins with an assumption, saying, "If the existence of matter be granted"; he then declares that "matter is only known by its effects, which are due to its motions"; he defines "substances" as "the products of unions of the elements of matter," and calls their modes of producing effects "properties." He then proceeds to maintain that "the phenomena of mind stand in the same relation to the brain and nervous system that all other phenomena stand to the substances that manifest them—in a word, mind is a property of the organised body." Mr. Ward furthermore states a number of laws which are bald assertions, not only devoid of proof, but even, at least so it appears to us, very doubtful. He says:

> "The properties of substances are more active in proportion as their molecular constitution is more complex."

and

> "Increase in complexity is accompanied by decrease in stability."

These laws, if laws they can be called, are correct within certain limits; but they are serviceable for important deductions only, if they can be proved to hold good without exception. This, unfortunately, is not the case; for chemists know of very complex substances which are extremely inert, while some of the simplest combinations are wonderfully active. Is not the element oxygen one of the most active substances known?

Prof. Lothar Meyer, in his well-known work, "The Modern Theories of Chemistry," while speaking in the last chapter but one of the stability of chemical combinations, incidentally mentions the instability of complex combinations. He adds:

"But it often happens that a simpler degree of combination, which is more stable than a higher with respect to one agent, as heat, is less stable than the higher with respect to some other agent. Thus, for example, tungsten pentachloride is less stable when exposed to moist air than the hexachloride; the nitrites which are produced by heat from nitrates with loss of oxygen are less stable with respect to chemical reagents than the nitrates are. The same is true of sulphites in relation to sulphates," etc.—Translated from the eighth edition (1884), p. 609.

However probable these laws appear *a priori*, they are *a posteriori*, at least in the shape presented by Mr. Ward, and for his purpose, untenable. But suppose they were true, of what avail would they be for an explanation of mind? Can mind be explained from the instability of highly complex chemicals?

Mr. Lester F. Ward's laws remind us of Mr. Spencer's formula of progress. He says:

"Progress is a passage from a homogeneous to a heterogeneous state. It is a continually increasing disintegration of the whole mass, accompanied by an integration, a differentiation, and a mutual, perpetually-increasing dependence of parts as well as of functions, and by a tendency to equilibrium in the functions of the parts integrated."

Complexity may frequently be an accompaniment of progress, but it most certainly does not constitute progress. There are even instances in which a passage to greater simplicity is an infallible symptom of progress. Would not an inventor feel sure of having made great progress in the construction of a piece of machinery, if he should find a contrivance for simplifying one of its parts, so that he could accomplish the same result with fewer wheels and cranks? Progress can, as little as spontaneous activity and awareness, be explained by an increase of complexity, for, indeed, there are or may be infinitely more complex processes than brain-motions which do not produce mind, and I cannot understand how Mr. Ward can so confidently "predict higher properties from higher degrees of aggregation."

All these so-called "laws" of Mr. Spencer's and Mr. Ward's in-

vention labor under the error of attempting to explain mind from matter and motion. We might as well attempt to explain the nature of logarithms from the rags that were manufactured into the paper upon which Vega's tables are printed!*

The complexity of molecular aggregation, according to Mr. Ward, is limited; he says:

"Molecular aggregation or chemical organisation could not in the nature of things go farther than the production of protoplasm. This substance already oversteps the limits of molecular activity and trenches on the domain of molar motion. If matter is to produce any wider effects it must be through the organisation of protoplasmic bodies."

Granted that it does, we cannot see that "it must"; Mr. Ward certainly does not prove it, but is satisfied with the mere assertion.

He further declares that "with increase of brain there is a constant increase in the mind-element or psychic property." If that were so, why is the elephant not cleverer than man? The theory that a greater mass of brain indicates a superior mind has long since been given up by physiology.

We do not deny Ramón y Cajal's statement, that "the human brain owes in a great measure the superiority of its activity, not only to the considerable number of its elements, but especially to the extraordinary richness of its means of association." Indeed, it is an old truism which has been repeated these last fifty or even one hundred years in almost every text-book, but it does not explain either mind or the origin of mind. If that were the gist of our latest discoveries in physiology, we might as well abandon all further study of its progress.

After his excursion into the field of physiology, Mr. Ward comes back to the assertion from which he started, that mind is a property of matter.

This is not monism, but henism; and, as in all henistic concep-

* Having discussed the problem of mind and also of progress on other occasions, I need not enter here into further details. See "The Origin of Mind," in *The Soul of Man*; *The Monist*, Vol. III, pp. 89–90 and p. 236; "The Test of Progress," in *Homilies of Science*, pp. 36–42. Compare also the chapter "Signification des états de conscience et télépathie de l'âme," in the author's *Le problème de la conscience de moi*. Paris: Felix Alcan, 1893. The latter is not yet published in English.

tions, so here also a palpable dualism lurks. Mr. Ward declares that "the antithesis between matter and property is absolute." He concludes his article with a puzzle; he says:

"Turn it as you will, twist it as you may, matter can only be affected by matter, and the impact of moving matter against other matter is, in the last analysis, the essence of force. And this is true of the method which mind itself employs. Thought and feeling, in and of themselves, are powerless, nay, they are *nil*."

If mind is a property of matter, and if properties of matter are modes of motion, as Mr. Ward stated in the beginning of his article, thought and feeling must, according to *Barbara*, which is the most conclusive figure of logical syllogisms, also be regarded as modes of motion. How can he call them "powerless" and "nil"? Can motions be powerless?

Mr. Lester F. Ward continues:

"They [i. e. thought and feeling] can only act through a motor system which uniformly and necessarily accompanies the sensor system, which transfers molecular nerve-vibrations to the muscles, transforms them into muscular movements, and communicates them mechanically to the world without."

I must be much mistaken in Mr. Lester F. Ward's view, but the tendency of the whole article seems to me to convey the idea that mind is an extremely complex mode of motion of matter. The last quoted passage seems to indicate that thought and feeling are something that is neither matter nor motion. Mind, we are told, cannot act on matter, because, being a property, it is immaterial. Yet motion, although also a property, and, as such, also immaterial, is said to affect matter, and at the same time, we are informed, motion is affected by mind. The nervous motor system, accordingly, would have to be regarded as a mediator between mind and the material world.

We confess our inability to understand this so-called monistic theory.

* * *

Dr. Robert Lewins is the founder of a system called hylo idealism, or auto-monism, which has found enthusiastic supporters in the late and much-lamented Miss Constance Naden, and in Mr. George M. McCrie. Hylo-idealism carries idealism and materialism to their

utmost extremes and places them side by side; yet its upholders have not succeeded in showing to the world how the contradictions of these two systems should be reconciled. Dr. Lewins maintains in the present number the unity of thought and thing; and auto-monism, which is but another name for hylo-idealism, is represented by Mr. McCrie, in the article, "The Subjective and Objective Relation."

We agree with Dr. Lewins's position, if he means that the soul is coextensive with its conception of the world; that it is creator and creation; and we call attention to the curious coincidence that a Buddhist priest expresses the same view in an article that also appears in the present number of *The Monist* (see pp. 163-174). This identity of the soul with its own representations, seems to be the auto-monism which Miss Naden held. She says:

"What we know as the external world is composed of colors, sounds, tastes, touches, and odors; and since there can have been no existence prior to their birth in the sensory ganglia, we see clearly that every man is the maker of his own cosmos."

This cosmos, viz., everybody's own cosmos, Miss Naden says, in the quotation adduced by Mr. McCrie, originates, grows, decays, and dies. Now we ask, what is that from which it grows and into which it dissolves? Dr. Lewins boldly declares that there is nothing beyond our self. We freely grant that there cannot be anything *in* self, except it be a part of self: but who will for that reason deny the existence of the world as parts of which we, all of us, including Dr. Lewins and Mr. McCrie, in spite of their theories, feel ourselves. Mr. McCrie is very explicit in stating that the ego, our individual self, is coextensive with the outside world. He says:

"Subject and object are coterminous, neither before nor after the other now and always.

"Other selves are not outside; they with their respective egoes are part of my individual self. So egoless or outside stimulus is really knowable as external. It is part of the cosmos which egoes like I spin from my mental self. And when I image such externality I but create it."

Whether I misapprehend Dr. Lewins's meaning is difficult to say. There may be a difference in our definitions of self and world.

At any rate, it is strange that my monism does not surrender the cosmos for the sake of self, but on the contrary, self for the sake of the cosmos. I agree with our Buddhist friends that the great All, the world, or God, alone exists: our individual self is an illusion. My religion, accordingly, would not be "a Narcissus-like self-worship," but a self-extinction, so that the truth alone should prevail. I have given a condensed statement of this view, which may appear to many as a modernised conception of Nirvana, in the November *Forum*, from which I quote:

"The human soul consists of two elements, self and truth. Self is the egotistical desire of being some independent little deity, and truth is the religious longing for making our soul a dwelling-place of God. The existence of self is an illusion; and there is no wrong in this world, no vice, no sin except what flows from the assertion of self. There is but one religion, the religion of truth. There is but one piety, it is the love of truth. There is but one morality, it is the earnest desire of leading a life of truth. And the religion of the future can be only the Religion of Truth."

It is not impossible that Mr. McCrie's words "*I* is everywhere in the universe" must be construed to mean essentially the same as when I say that self must be recognised as an illusion. But, granting that there is an agreement in meaning, we are justified, we think, in complaining of the inappropriate and misleading terminology of auto-monism.

In order to attain to a true monism, i. e., a unitary and consistent world-conception, we should bear in mind the following maxims:

(1) Knowledge is a description of facts which in their oneness are called reality; (2) ideas are abstracts describing certain features of reality, omitting all others; and (3) the reality from which we derive our notions is one inseparable whole.

The facts from which we start are the sensations of our experience. All the knowledge possessed by human beings is due to analysis and renewed synthesis of our sensations. Every one, as the Rev. Mr. Ashitsu and with him Dr. Lewins, Miss Naden, and Mr. McCrie say, creates the world in which he lives. The objects which we see, the things which we think are parts of our own being, for our soul

consists of these images and representations. What Schopenhauer calls "*die Welt als Vorstellung*" is not a possession of our soul but an actual part of our soul. Our soul is the product of a development rising out of reactive sentiency. The reactions change into impulses, the feelings into images ; and when the images develop into ideas, under their guiding influence the impulses become conscious will. Thus a spiritual world naturally springs up above the material world, and there would be no objection to calling it supernatural, if we could but exclude the old dualistic notion that the supernatural is imported into the natural world from without, and that man is a combination of both, so that the supernatural could exist independently of its natural basis.

Idealism, in teaching that every soul creates its own world, is perfectly legitimate, but it shoots beyond the mark when it requests us to believe that our subjective existence is all there is, that the objects of our experience, i. e., the things indicated in our ideas, are merely parts of our ego and that there is nothing beyond.

Suppose we could systematise our knowledge and attain to a unitary world-conception that would be satisfactory and free from contradiction without belief in an objective world, we should not hesitate to recommend auto-monism as the simplest world-conception. But in fact we cannot think of ourselves without construing our own sensations as objective things. We project automatically the images on our retina into space and our daily experience justifies our methods of conceiving objects as external and independent, and of treating them as such.

When we analyse our sensations we find (1) that they are states of awareness : they consist of feelings. (2) That these feelings are various in kind : they are feelings of pleasure and pain, they are sensations of the various senses, and also conscious states of abstract thought. (3) That the various forms of feeling possess various meanings : they are indicators, each kind of feeling possessing a special significance.

We do not say, the world consists of sensations, but the facts immediately given in our experience are sensations. Now, when we speak of objects we mean that, the presence of which is indicated by

the various kinds of feeling. For instance, the sensation red is as much a subjective process as an illusion, but it indicates the presence of a certain event which in its contact with the retina of the eye produces the sensation red. The sensation hardness indicates the presence of a strong resistance, and other sensations indicate other presences. Naïve realism regards redness as an object, while automonism denies the existence of any outside object of which the sensation redness would be an indicator. Our scientists have come to the conclusion that the objective event which on the retina produces a red sensation is a peculiar ether-vibration.

Mr. McCrie finds a difficulty in my position. In his argument maintaining the oneness of subject and object, he approvingly quotes from me that "neither the subject is given nor the object, but an interaction between subject and object," and adds:

"The interaction is not everything. There is something which precedes it in time. There is the ethereal vibration.

"The vibration prior to sensation is not represented in any mind. Is it objective?"

In reply I have to state that the ethereal vibration is an abstract notion of high complexity. It is a scientific theory invented to explain the nature of light in agreement with other facts of experience, i. e., to think light as actuated by the same laws as other phenomena, and to enable us to predict its actions under changed conditions. That objective process which we call by the word ether-vibration, existed, undoubtedly, before it reached our eyes. Every reality exercises some effect upon other realities. The nature of reality consists in producing effects; and this producing effects, the quality of affecting other existences, is what we call objectivity. The apple that falls to the ground is to the earth, when it touches it, an object, and *vice versa*. Now monism believes that all objectivity is at the same time, from its own standpoint, subjectivity. There is no object but in itself is a subject. Our subjectivity consists in feeling and thinking. But subjectivity is not always feeling, still less is it thinking. It appears to be blind and feelingless in the realm of inorganic existence, but it develops in organised life awareness and through awareness the faculty of representation.

Without entering into the details of physical and physiological investigations concerning light, or judging of the reliability of such an assumption as the existence of ether, we simply state that our method of describing the objective world consists in naming the same event, the same quality, or the same relation, met with in our sense-experience, with the same word; and the various words serve as keys which at once call up the various kinds of memories they represent.

All that science does and can do is to present a description of our experiences in systematic form, so as to enable us to find our bearings in the world in which we live. The world-picture that we carry in our souls is painted in the living glow of sensations, but our method of describing things consists in representing them as matter moving in a special way through space.

It is a peculiarity of objective existence that it cannot be represented otherwise than as matter moving in space; and again it is a peculiarity of subjective existence that it has no other means of representing objects than as matter moving in space. Hence the materiality of the world as it appears to us, and hence, also, the apparent materialism of science, which has no other means of tracing the processes of nature than by representing them as matter moving in space! But science only appears to be materialistic; it is not materialistic, for all scientific formulas describing the motions of material particles in space are but the objective phase of being and have to be interpreted from the facts of our own subjective existence. Our soul is part and parcel of the world, and our spirituality proves that the tree whose efflorescence we are, contains in its juices all the elements of our nature.

We say: There is no object which is not at the same time a subject, but we do not say with Dr. Lewins that our "thought is the thing." Monism (as we understand it) cannot accept the identity of thinking and being. The origin and growth of the subjective world of thought which every one has to create for himself, is explicable only on the supposition that there is a greater and everlasting reality from which it develops.

There is one reality only, part of which is given to every living

creature in the experiences of his world-sensation and world-conception; and this one reality, so far as it is in us, or rather, so far as *we are it*, is a world of feelings. Yet the objects which we observe, as they affect us and other objects, appear to us as a world of bodies moving about in space.

It is apparent that subjectivity and objectivity are abstract notions only. My soul is my existence, as I feel it; my body is my existence, as it affects other existences. I know of my body as a body through the same channels of sense-experience which give me information concerning other bodies. One hand is to the other hand an object; it is felt, and thus we may say, I have an idea of its shape. I can see the color of my eye through the looking-glass only, and the bodily forms of those organs, such as the brain, which cannot, either directly, by touch, or indirectly, by reflecting them in mirrors, become objects of our sensation, remain to our reproductive and representative faculties entirely inaccessible. Our retina consists of sentient structures; these feel the forms and colors of objects before them, but they do not feel the forms of their own objective being.

In such or similar considerations of our own existence, the expression "I" is misleading and must be avoided. When we say, "I have a representation of my body," we mean, that some limbs of the body have been perceived by other limbs or organs, and all these items of purely objective sense-experience, registered somewhere in the brain in ganglionic structures that are interconnected, combine into a representative image called "my body."

Physiology assumes that every idea that is thought vibrates through the brain as a peculiar form of motion. If we could peep into the heads of others we might see the mechanism of their thoughts at work; but we ourselves do not feel the bodily forms of our cerebral structures or their motions. Our subjectivity consists of feelings, and appears as matter in motion to other subjects, to outside observers, only; we appear to ourselves as bodily objects simply because and to the extent that some parts of us are objects to other parts of us.

Monism does not say that the soul is the body, but that body and soul form a unity. Neither is the soul a function or property

of the body. We might just as well and with the same plausibility say the body is a function of the soul. Body and soul are both abstractions; they are, although radically different in their content, of the same degree, and to regard the one as substance and the other as its property, as Mr. Lester F. Ward proposes, must lead to confusion.

The simplest way of viewing the world monistically is to regard all objectivity as animated with subjectivity; all matter is, as Clifford calls it, "mind-stuff." There is no reason for assuming that the subjectivities of inorganic events are full-fledged feelings, such as we experience; but they are something analogous on a lower scale; they are elements of feeling, and will become actual feelings in such combinations as make a continuous interaction possible with a preservation of form. Not the complexity of protoplasm constitutes its virtues, but its peculiar plasticity, which is so constituted that the forms of former impressions are preserved in the continuous whirl of its life and admit of resuscitation. Memory is the basis of mind. One feeling can be felt by another, and thus the one will intensify and give import to the other. Impressions of a special kind, in reviving the memories of former impressions of the same kind, are felt by these sentient structures to be of the same kind, and thus they become indicators of the presence of the same objective event. Feelings of various kinds are the elements of mind, and the meanings which these feelings naturally acquire in the course of their development constitutes the nature of mind.

It is a very strange fact that innumerable volumes have been written about mind and mentality, but that we find in few of them, if in any, a serious investigation or plain definition of the nature of mind. Dualistic thinkers of past ages were in the habit of treating mind as a substance; mind is to them a material thing, only very much more refined and sublimated than the matter of objective existence. Their expressions should not be taken too seriously, however, for they are intended, if I am not mistaken, to be figurative and allegorical. As soon as they attempt to explain the nature of the soul without allegories, they drop either into mysticism or limit themselves to mere negations.

Mysticism and negativism are of no avail. Mere negations explain nothing, and exclamations of awe and surprise only betray lack of understanding and ignorance. A world-conception in which mind appears as a mystery must surely be defective, for a philosophy is good for nothing, if it does not give a satisfactory account of the nature of our own being.

Granted that the whole world consists of mind-stuff, that all objective being is in itself subjective, we can very well understand that soul arises in the world; that organised substance develops irritability and even sentiency, and that meaning originates in sentient substance. From the monistic standpoint, mind ceases to be a mystery. Mind is a wonderful thing, but it is not mysterious. There are still many problems connected with mind, but the main problem is solved.

Mr. McCrie rebukes me for saying that mind is "a new creation," and that, rising from certain combinations of facts, it builds an empire of spirituality above material existence. He says:

"No combination of already existing facts can make anything properly 'new,' .... The development of potentiality into actuality, though it may involve the novel, does not, in a philosophical sense, imply the *new*."

"Potentiality" is a good word in its place, but it can be misunderstood. An egg may be called a potential rooster, and a lump of iron a potential ploughshare, a potential cannon-ball, and a potential statue, all at once. Indeed, anything is, potentially considered, any other thing. In this sense, there is nothing new in the world, and we might as well strike out the word in our dictionaries as meaningless.

Mr. McCrie's distinction between novel and new is not sanctioned by usage. When Gauss for the first time employed electric currents for the transmission of intelligence to a distant place, he had invented the telegraph; and the telegraph was something new to mankind; it had never as yet been known, or heard of, had never existed upon the face of the earth. No one can deny that new forms are new things: a certain combination of springs, with wheels and other contrivances, makes a watch, and if a chemist melts a watch in his crucible, the watch is gone, for the watch is not the

material of which it consists, but the form into which the material is wrought.

We need not be too much concerned about Mr. McCrie's stricture, for he approvingly quotes the very same idea from the writings of Miss Naden, who says of "memory and comparison," that "the union of the two renders possible a *new* cosmos of emotion and intellect."

In a certain phase of man's mental development the theory of regarding matter and the combinations of matter as "substances," while its various modes of motion are treated as the "properties" of substances, seems quite helpful. But it is not. As soon as we try to take this antithesis seriously, we fall into the same mistake which Kant made, when postulating his "things in themselves." Mr. Lester F. Ward says that matter is known through its properties only. Matter in that case becomes as mysterious as Kant's "thing in itself." Both are unknown and unknowable magnitudes; and whenever ideas become unknowable, we may rest assured that there is something wrong about them.

How can mind, as Mr. Lester F. Ward proposes, be a property of the body? Thought is so radically different from anything material, that we cannot explain the former from the latter, or regard it as a property of it. We might rather say that fire is a property of wood, or the work performed by a steam-engine the property of coal. Mr. Lester F. Ward's monistic theory of mind is no better nor worse than an attempt to explain a pensive verse or sentence as a property of the poet's ink-stand.

Mr. Lester F. Ward might obviate my criticism by saying that he understands by matter not only those properties of objective existence which our physicists define as matter, but also its subjectivity which will, in a higher development, blaze forth into feelings and thought. This would not agree with our usage of the word "matter": but even if it did, we could not approve of saying that mind is a property of the body; for in that case, mind would be a part of the body and, indeed, the most important part; not a property of the rest, but its master.

The terminology of Mr. Lester F. Ward's monism lowers the

nature of mind. Mind being the property of matter, matter would have to be regarded as the all-important reality of the world, and mind merely as a display of its forces. And this implies a grave misconception of the world and of life. Mind is the ruler, and matter is the slave. The more mind grows and the higher it develops, the more powerfully and determinedly will mind subdue the unwieldy masses of matter and claim them unconditionally as will-less and right-less property. Mind rules, and moves, and shapes matter at will to its own purposes.

So long as we regard our bodies as our true existence, and mind as a mere function of the body, we cannot reach a satisfactory view of the world and shall remain unable to explain our deepest and holiest aspirations.

Our body is transient; it is doomed to die; indeed, its very life is a continuous death, a constant decay, and an incessant burning away. The matter of which we consist at a given time, the substance of which, according to Mr. Lester F. Ward's terminology, our mind is a function, is no substance in the proper sense of the word. It is nothing permanent, fundamental, or abiding. On the contrary, it is constantly changing; it is incessantly pouring in and pouring out. Yet the soul, the so-called function, is permanent. As we inherited our soul from the past, so we shall transmit it to the future. The sacred torch of mental life is handed down from generation to generation, and the spiritual treasures increase more and more with the immortalised results of our labors.

Our body is individual and limited; our soul is universal and infinite. My bodily existence is different from the bodily existence of every one else. But the same idea may ensoul many men, and in our spiritual life we can be of one mind with others.

The ethics of the body is selfishness; it is formulated as hedonism and proclaims the maxim that "right" means the pursuit of the greatest possible amount of pleasure. The ethics of the mind is mental growth; it demands the development of the soul in self and in others, and finds morality in the love of truth, without taking into account the sacrifices it may cost.

Far from regarding ourselves as bodies possessing the property of mind, we say, our inmost nature is mental; we are mind.

Mind is the consummation of nature. If the forces of nature were throughout a mere blind display of purposeless motions, the world would be without meaning. If there were no souls that could decipher their luminous language and discover the divinity that pervades their being, the beauty of the starry heavens would shrivel up into nothingness and be comparable to a senseless heap of rubbish. Existence has meaning only because it begets meaning, and the meaning of rational minds is a revelation of the spirituality of the universe; it is the reflexion of its rationality describable in eternal laws; it is an incarnation of the Deity that pervades all being.

Our monism is akin to Goethe's unitary world-conception, who expresses it in the following stanza, which we have translated for the present occasion:

"When in the infinite appeareth
The same eternal repetition:
When in harmonious coalition
A mighty dome its structure reareth:
A rapture thrills throughout existence,
All stars, or great, or small, are blessed.
Yet all the strife and all resistance
In God, the Lord, 's eternal rest."

EDITOR.

ARE THE DIMENSIONS OF THE PHYSICAL WORLD ABSOLUTE?

SPACE, GEOMETRIC AND ACTUAL.

I.

IT is a fact of daily experience, that a body can change its position in the space which we inhabit, without undergoing any visible alteration of form. Its displacement is apparently a simple change of place, nothing more. Places, accordingly, are regarded by us as all alike, as indifferent; and we infer from this fact that space is everywhere the same, that is, has everywhere the same constitution—the same capacity of receiving bodies. This is the quality which is improperly called its homogeneity, but which we shall call its isogeneity.

It follows from this that we conceive of space as limitless. If it were circumscribed, if, for example, the vault of heaven were its boundary, space would cease to be everywhere the same; once arrived at the furthermost bounds, the advance of bodies would be impeded, they would flatten themselves against the barriers and necessarily change their form. We must then conceive of space as infinite and boundless.

And yet closer observation will show us that the isogeneity of space is rather theoretical than real. Liquids assume the shape of the vessel into which they are poured; the vapor of water rising in the air, the floating clouds, change their form constantly. Further, science, working with instruments which are becoming daily more accurate, proves ocularly that even solids vary their shapes in this

manner and assume different forms, according to the mediums in which they are. In the same way as a balloon, to use a rough comparison, in the course of its aerial journey, becomes elongated, flattened, puffed out, or folds over upon itself continually.

Thus, solid bodies, by simply having their position changed on the globe, following either a vertical, a meridian, or a parallel, undergo, by virtue of this change of position, numerous constitutional modifications, which are followed by both interior and exterior alterations of form. Inalterability of form is assured only on the supposition that the properties of space are everywhere invariable. This would imply that temperature, pressure, magnetism, gravity, light are always invariable, a fact which is not, and never can be true. But this is equivalent to the declaration that isogenous space is a hypothetical and imaginary space, quite different from actual space, and inaccessible to experiments, since experiments can only be practised in the sphere of actuality.

Such space may be called geometric space. It is distinguished from actual space by this theoretical property, that a body can change its position in it, without changing its form. There may be terrestrial or even local physics, chemistry, and mineralogy, but there is no terrestrial or local geometry. There is but one geometry, which is a universal geometry—universal in the sense that every intelligent being, no matter who or where he is, who has this conception of space will arrive at the same geometrical propositions.*

But this is not all. Not only is geometrical space isogenous, as we first believed real space was, but it is also homogeneous in the true sense of the word; that is to say, it has the capacity of receiving *similar* bodies, or bodies of the same form but different dimensions.

* I cannot, accordingly, accept the view of M. Poincaré (*Revue générale des sciences*, Dec. 15, 1891, p. 774), that hypothetical "beings, whose minds and senses should be formed like ours, but who lacked all previous education, could receive impressions from some properly chosen outside world such as would lead them to frame a totally different geometry from Euclid's, and to localise the phenomena of such a world in a non-Euclidean space, or even in one of four dimensions." This assertion of M. Poincaré's is a strange one, to say the least, and he himself calls it "slightly paradoxical."

In order clearly to explain the difference between isogeneity and homogeneity, we may compare a plane with the surface of a sphere. The plane is homogeneous, the surface of a sphere isogenous. On the sphere as on a plane, a figure, a triangle for example, can be displaced in any way, yet will still remain the same. But while on a plane one can draw similar figures, that is, such as are the exact counterparts of each other and only differ in size, it is impossible to proceed thus on the sphere. Thus, two equilateral spherical triangles, belonging to the same sphere, if not of the same size, are not similar, because the angles of the one are not equal to those of the other; whilst all equilateral plane triangles are similar and have the same angles. Spherical triangles which are similar belong to spheres of different radii. We may also call attention to the fact, that on the plane, straight parallel lines can be drawn, but not on the sphere.

Geometric space appears to us thus as capable of indefinite extension or indefinite contraction. A geometric figure is one that can be enlarged or reduced at will, can be viewed from the large or the small end of a telescope without change of form, or the gain or loss of any of its properties.

II.

But the mathematician works in physical space; the figures which he fancies he traces in his own space, he really traces in actual space. Are we not, then, endeavoring to establish a useless distinction founded on a wrong interpretation of our experiences? Just as we believe by instinct, almost, that actual space is isogenous and that bodies, especially solids, can be displaced in it at will without alteration of form, might bodies also not possibly be enlarged or contracted without varying their form? The question resolves itself into this: are the dimensions of the world in which we live, constant, and, consequently, are they absolute?

We will now proceed to demonstrate that these dimensions are absolute and constant, and that consequently actual and geometric space are different. But before entering upon this question, it will

be best clearly to observe its nature and bearing. To this end let us simplify the problem.

Here is the earth, upon whose surface, men, intelligent beings, live and move. They have measured the length of a meridian, they have taken a quarter of it and divided it into ten million equal parts, which they have named a metre; from this metre they have derived the hectare, the litre, the kilogramme; with these they have measured everything, even themselves and have established, for example, the fact that their average height is 1·60 metres.

Near the earth, and resembling it, though of smaller size, is another globe. To fix our ideas, we will suppose this globe is half the size of ours; that intelligent beings inhabit it; that they are half as small again as we, though of exactly the same form; that these too have obtained a metre by measuring their meridian and dividing its quadrant into ten million parts—a metre which compared with ours is, say, only 50 centimetres. From this metre, they have derived their hectare, litre, etc.

We will now suppose that an inhabitant of our globe finds himself suddenly transported to this other one, and that he also experiences a proportional diminution of size; will he be aware of his change of *habitat*? If actual space were identical with geometric space, if it were homogeneous, we should be tempted to answer at once no; because in geometric space the size of a figure is not absolute; it increases or diminishes according to the size of the unit adopted.*

* This proposition is demonstrated in mechanics: Laplace formulates it thus (*Exposition du système du monde*, Liv. V, Chap. V, *ad finem*): "The law of inverse attraction according to the square of the distance is that of all emanations proceeding from a centre. It appears to be the law of all forces whose action is felt at appreciable distances, as in the case of electricity and magnetism. Thus, this law, being found applicable to all phenomena, must be regarded, by reason of its simplicity and its generality, as absolute. One of its most remarkable properties is, that if the dimensions of all the bodies in the universe, their distances and their velocities were proportionately increased or diminished, they would still describe exactly the same curves as they now do, so that were the universe reduced to the smallest space imaginable, they would still appear the same to our eyes. Consequently these appearances are independent of the dimensions of space: as by virtue of the law of the proportionality of force to velocity, they are also independent of any motion that may take place in space. The simplicity of the laws of nature, accordingly, per-

The question here put is not wholly one of geometry, nor one of physics. A psychological element has been introduced; for a comparison has been instituted between two states of consciousness, one present and one past, presupposing memory and a sense of measurement. This sense is neither sight nor touch. Sight enables us to judge only of the relative dimensions of objects, the only things not affected by distance. The inhabitant of the globe we are speaking about, can derive no help from the sense of touch: for his limbs, his hands particularly, will be reduced to a size proportioned to the objects he has to take hold of. Let us pass over taste and smell. Let us also admit that his acuteness of hearing, that is to say, his faculty of judging distances by the loudness or faintness of sounds, will also be adapted to his new abode.

These senses, then, will be of no practical use to him. But there is one of which we must make an exception, unless we mean to regard him as a being deprived of intelligence; and that is motility, or the sense of motion, the faculty of moving and of feeling that one does move. In a word, he retains the sensation of effort and fatigue. He will experience this each time he displaces any heavy object or even moves his own body.*

Having premised this, let us now go on and suppose the planet Mars to be reduced to half the size of the earth. In supposing this, we do not depart much from the truth, seeing its density is about 0·95 of the earth's, and its radius about 0·517.

We will regard this as exact in all points and assume that Mars has its old and new continents and possesses cities like New York and Paris, on a small scale. Of course, we must give it a sun, as small again as our own and half as far away. We will suppose a Parisian is transported during his sleep to the Paris in Mars, where he finds himself on awakening by all the objects familiar to him, in-

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mits us only to observe and know relations." This proposition can be absolutely true, only if psychical phenomena also depend on the law of attraction.

* In all my writings on philosophy, and particularly in my *Psychologie comme science naturelle* and in *Le sommeil et les rêves*, I have emphasised the importance of this sense, which though not muscular, partakes of that nature, and shown how indispensable it is for the operation of the mind.

cluding his wife and children, his furniture and tools, his neighbors, the shops, theatres, and boulevards. He opens his eyes, beholds each thing in its accustomed place, and feels no surprise. But as soon as he has risen, washed and dressed himself, gone down stairs and come up again, everything seems different. The common characteristic of all these acts is the raising and lowering of weights. Thus, the moment he steps out of bed, or descends the stairs, he lowers his body; when he lifts the water-pitcher, picks up his clothes, when he reascends to his apartment, he raises his body. The sensation of effort here comes into play. Let us see what will happen.

III.

The radii of Mars and the earth being as one to two, their volumes are as one to eight; and as their densities are the same, their masses also are in this proportion. It follows thence that the weight of any object on the surface of Mars is one-half what it is on the surface of the earth. With respect to mass alone, it would be one-eighth; but as bodies on the surface of Mars are one-half nearer the centre of mass than bodies on the surface of the earth, and as the force of gravity is inversely as the square of the distance, the weight of bodies on Mars, being the combined result of the mass and the distance, is only one-half as great as it is on the earth.

Our Parisian there will be reduced in height, from, say, 1·60 metres to 80 centimetres. From this it will follow that he will have lost seven-eighths of his mass, and, moreover, as he is living in Mars, where the attraction of gravity is only one-half as great as it is on the earth, his weight will be only one-sixteenth of what it was, so that, if on the earth he weighed 80 kilogrammes, in Mars he will weigh but 5. When on the earth, he was obliged to make a vigorous effort to raise his body to a given height. We will suppose he could jump half as high as himself, say about 0·80 metre by terrestrial computation. If he retain the same muscular energy when on Mars, where his weight is only one-sixteenth of what it was, he could jump, with the same effort, sixteen times as high in terrestrial measure. But it is reasonable to suppose that his energy has suffered the

same diminution as his mass, consequently he will only be able to jump twice as high, that is, 1·60 metres in terrestrial measure, or 3·20 metres in that of Mars.

On the earth, with a given effort, his jump was equal to one-half of his height; on Mars, with the same effort, it will be twice as great,—that is, proportionately, four times greater. When our Parisian gets out of bed, when he descends the stairs, and, more particularly, when he reascends them, he will feel four times lighter. He will go upstairs four steps at a time. His water-pitcher, his clothes, will seem four times lighter. In reality, in proportion to his strength, these objects are only half as heavy as they were, but as he only lifts them half the distance to obtain the same result, his efforts are additionally lessened in the same ratio. If it took him one hour to make the ascent of the Eiffel Tower, it will only take him a quarter of an hour to accomplish the same journey in the Martian Paris. Probably he will not attribute this peculiarity to its real cause, but he will at least be aware of it.

It is hardly worth while to consider the contrary effect upon an inhabitant of Mars who would be transported to our earth. To him, everything, including his own body, will appear four times heavier; the steps by which he ascends to his room, three times higher. If he wishes to make the ascent of the Eiffel Tower, before he has gone a quarter of the distance, he will be out of breath, and will probably wonder what can be the cause.

We have taken for granted that the density of Mars was the same as that of the earth. This is the most rational supposition. But let us go still farther. Let us suppose Mars to be the earth in a condensed state and that, in consequence of this, its mass is exactly the same.* The force of gravity on its surface would then be four times greater than that on the earth, the distance from its centre being only half as great. Our Parisian would then weigh four times as much on Mars as he did on the earth. True, he will have

* Such a supposition is incompatible with Newton's theorem, just mentioned in the words of Laplace. That theorem assumes that in the reduced scale, the density remains the same at every homologous point. I only touch this hypothesis to forestall any objection that may possibly arise in the mind of the reader.

retained the same mass, and, consequently, the same muscular strength. But the height of his jump will be none the less diminished in the proportion of four to one, that is to say, he will only jump 20 centimetres (terrestrial measure), equal to 40 centimetres (Martian measure). And all objects will appear to him twice as heavy. In reality, they will be four times as heavy; only, as by reason of his height, he need not lift them more than half as high, he gains the difference.

There is only one way to dupe our man, and that is to suppose that as soon as he is transported to Mars (the Mars of our first supposition*), instead of shrinking to half his former size, his former size is doubled. Then, his volume and mass will be increased in the proportion of 8 to 1, as will be his strength. On the earth, he will continue to jump to the height of 80 centimetres, one-fourth of his new height, while on Mars, where the force of gravity is one-half, he will jump twice as high, that is, 1·60 metres terrestrial measure, or 3·20 metres Martian measure, which is just half as high as his increased stature. Thus he will be cognisant of no change.

But, on the other hand, we see that Mars will have ceased to be a geometrically reduced counterpart of the earth. The houses of this Martian Paris, too, will have to be twice as high, and deep, and broad: and this imaginary city will occupy four times the actual space covered by the original one, and sixteen times as much, if we remember the relative measures of Mars. In a word, the new supposition is a direct contradiction of the conditions of our problem.

IV.

Nevertheless, nature shows us tigers and cats, crocodiles and lizards, pythons and eels, rats and mice, lobsters and crabs. Moreover, we have been able to breed large and small dogs, large and small hens. Many living creatures, fish, for instance, grow all their lives and yet retain the same form. We have ourselves invented the art of drawing, which is based upon the principle of similitude. Thus, writers of fairy stories and humorous authors, like Swift, have fami-

* Radius one-half, density unity, weight at surface one-half.

liarised us with the idea that there may exist cities of dwarfs and of giants, the exact counterparts of ourselves, though of different dimensions. If Gulliver, on coming to Lilliput, or Brobdignag, had been increased or diminished in size, so that his stature harmonised with the stature of the inhabitants of these countries he would not have noticed any abnormality in their appearance.

To imagine this, is, nevertheless, wholly incompatible with the known results of science. The cat is not a tiger *in petto*, nor is the Lilliputian a reduced image of a Brobdignagian, nor a tiny crsytal of alum the precise copy of a large one. If this were so, we should no longer be in need of atoms, molecules, or cells. Mathematically speaking, the cell, molecule, or atom, are worlds capable of assuming within their limits all kinds of shapes; but from a chemical or physiological point of view they are absolute quantities not susceptible of change.

This consideration refutes at once an objection which here presents itself: namely, that we commit an error in not applying the reduction of dimensions to atoms and their distances, and, consequently, to the molecule, the cell, and the other natural units. It would result from this, such objectors say, that the combustion of a reduced molecule of carbon, that is to say, its precipitation on oxygen, would produce only a reduced living power, reduced, namely, in the proportion of the square, (equivalent in our hypothesis to a reduction of one-fourth,) and that thus under the same volume the Martian would possess a muscular energy only one-fourth of that of an inhabitant of the earth.

But this objection is only specious. It involves (1) an error of fact, and (2) an error of doctrine.

An error of fact: for observation discloses that carbon, hydrogen, and all chemical substances manifest the same properties at the most distant points of space. An error of doctrine: for the bodies which we call carbon, hydrogen, and so forth, are defined by their atomic weights; and a pretended molecule of carbon, composed of four atoms having a volume and a weight eight times less, and placed at distances half as great, would not be a molecule of carbon. In fact in the enunciation of his theorem, Laplace formally excluded

phenomena whose actions were manifested only at inappreciable distances.

Consequently, if there is water on Mars, that water is exactly like the water of the earth, and its molecule has the same form. Consequently, also, on our fictitious Mars, iron is iron, wood is wood; and it must be admitted that their resistance is the same as the iron and wood of the earth.

Geometrical units, properly so called, can be reduced without the reduction affecting other units, such as the second, the atomic weights, densities, cells.

One thing more. The brain of the Martian is, both in volume and weight, one-eighth of that of an inhabitant of the earth; should we say, therefore, that the ideas of the people of Mars are only one-eighth of the ideas of the people of the earth, and that their judgments and conclusions possess only one-eighth the validity of ours.

But I must abandon these transcendental observations, to regain the *terra firma* of our argument. Let us see whether our inhabitant of Mars, who is like us, could have houses like ours, that is to say, having the same proportions in all its parts. We will proceed by reducing the problem to its simplest form: A board resting on two supports capable of sustaining the weight of a man.

Let P be the weight, l, b, and h the length, width, and thickness of the board, and R the resistance of the material employed. According to a well-known formula we shall have:

$$\frac{Pl}{4} = \frac{Rbh^2}{6}, \text{ or } P = \tfrac{2}{3}R\frac{bh^2}{l}.$$

On Mars l, b, and h become $l/2$, $b/2$, and $h/2$, so that this structure, reduced one-half, will be capable of supporting a weight

$$P = \tfrac{2}{3}R\frac{bh^2}{4l},$$

that is to say, a weight four times less than P. But, as we have already seen, the weight of a man on Mars is $P/16$; hence, this structure will be four times as strong as it need be. We should, accordingly, have to employ materials of four times less resistance, or push the supports four times further apart, or let the board be four times lighter or else half as thick. In a word, the structure re-

quired on Mars must be four times lighter than that which pure geometry would call for.

Further back we noticed that in Mars the steps ought to be relatively four times higher than they are on the earth. Besides, their burglars and thieves must be so much more agile than ours. Their fences, accordingly, must be four times higher, and their windows barricaded up to the second and third stories.

Let us now see how a workman of Mars proceeds to put up a scaffolding. He has a hammer, a nail, and a plank. If our reasoning is to be governed by geometry, the volume of his hammer must be eight times less than one of ours, while its weight will be sixteen times less; and to sum up, since he only swings it half as far as a workman here does, the energy of its action must also be thirty-two times less. What can he do with such a tiny tool? What must be the resistance offered by the timber? What the force of penetration of the nails, lessened as they are in size in the ratio of 4 to 1? What kind of rivets will they use?

These few observations clearly show us that the inhabitants of Mars do not resemble us in all respects, and also that their industry is not a miniature of ours. In their Stone Age they could have made no possible use of flints, which were one thirty-second as powerful as those which our ancestors used, unless indeed everything else, tools and material, were proportionately weaker. But we have departed widely in this from the geometrical condition of similarity.

Suppose they have to build a pyramid, erect a cathedral or any other edifice; they will work four times as fast as we do; the materials which they use being sixteen times lighter and easier to move and it only being necessary to lift them one-half the distance. This reduces the work to be done in the proportion of 32 to 1, while the strength is only reduced in the ratio of 8 to 1.

V.

Let us now consider another aspect of the question. We have seen that the Martian measures are reduced models of our own. The reductions vary, according as one, two, three, or four factors

are used, or as a mathematician would say, according as they have one, two, three, or four dimensions. Thus, as we have already seen, their metre is but one-half of ours; consequently, their hectare is but one-fourth; their litre, one-eighth; and their kilogramme one-sixteenth: the reason of this last being, that a litre of distilled water on Mars, besides being one-eighth of the volume of ours is attracted only one-half as much.

At first glance there would seem to be in this nothing that would affect a Martian's life. But that is not the case, as we shall see.

First let us take linear and square measures. If an inhabitant of the earth requires six square metres of cloth to make a complete costume, it will take the same amount for the Martian, since the surface of the body he must cover is reduced in the same ratio as the square metre. But, insomuch as his sun does not emit any more heat than ours, the warmth and consequently the thickness of the garments he wears, must be *at least* equal to that of ours. Consequently, if he makes up the cloth himself, or if his wife knits his shirts and socks, they will doubtless be astonished at the quantity of material used and the amount of work necessary.

We have said, *at least* as warm and thick as what we use on the earth; for our supposititious inhabitants of Mars will soon become aware that bodies are heated and cooled much more quickly than formerly, and this for a reason which they will not be able to understand, namely, because there has been a greater reduction of volume than diminution of surface. If they put their hands upon a cold object, they will be more rapidly chilled; if on a warm one they will be more rapidly warmed. Changes of temperature being more sudden, they will have to introduce changes into their manner of living, of cooking, and of clothing themselves. We concede, of course, in order not to complicate the problem and to keep within the strict lines of geometrical reduction, that water continues to boil at 100°C., and that the degrees of temperature have not varied.

Consequently, their hectare of land, sown with hemp or flax, will not produce as much linen as before. If they use the same piece of land as a sheep pasture, they will be obliged to reduce the number of animals. They will also have to alter the number and

the quality of their meals. The food provided will have to be such as will repair the waste of the muscles and keep up the heat of the body.

For, on Mars, be it remembered, heat is quickly dissipated, the surface to be cooled being larger in proportion to the mass. On this account the inhabitants will eat more. But there is another reason for this. The surface of their lungs being larger in proportion to the quantity of blood and the combustion more active, one kilogramme of meat or of peas will not satisfy hunger there as it would on the earth.

Their pastures also have become insufficient. If, for example, they have heretofore lived on the product of one cow, the hectare now will be inadequate for her support and, as we have just said, it will be too scanty for the same number of sheep.

This applies to liquids as well. Evaporation is more active. A litre of any fluid on Mars will not allay thirst, as a litre will on the earth.

Thus, all measures, the metre, the hectare, the litre, and the kilogramme, though they will have remained alike, that is similar, from a geometrical point of view, from a practical standpoint will have become very different; and will be almost always totally inadequate for their similar Martian requirements.

Of luminous and acoustic waves we will not speak; it would be difficult to reduce them geometrically. We will stop our comparisons here.

VI.

The fact is thus established, that actual and geometric space bear no resemblance to each other; *that the former is not susceptible of geometrical reduction as is the latter;* that it is not homogeneous; and that it does not admit of similar figures undistinguishable by the mind.

Homogeneity remains thus the exclusive and characteristic property of geometric space, although this property is incompatible with reality, and cannot even be conceived as realised.

LIÈGE. J. DELBŒUF.

THE PROBLEM OF WOMAN, FROM A BIO-SOCIOLOGICAL POINT OF VIEW.

IN a book which will shortly appear before the public, M. Lombroso and I have carefully considered the problem of woman, from a psychological and biological aspect. It is perhaps the first study of the kind which has been made, based on scientific principles, for if woman has been the subject of the highest aspirations, desires, and thoughtful care, she has also been up to the present day scientifically ignored.

This being the first study of the question, it follows that it cannot be entirely free from the defects common to all pioneer efforts of the kind, and above all from the defect of not having given a complete development to the laws and principles set forth in it. Our essay has been preëminently biological and psychological, but the laws of feminine psychology and biology are capable of many sociological applications which have been entirely neglected in the book. In this article, I shall attempt to supply these omissions by setting forth some sociological conclusions belonging to the problem of woman. I shall strive to determine what are, according to our theory, the natural conditions of woman's life.

* * *

The life of all creatures is influenced by certain conditions of environment; if these conditions are wanting, the creature will perish; if these conditions only partially exist the creature will live with difficulty and in a state of suffering, if it be a creature endowed with sensation.

Oxygen is necessary to life in the vegetable and animal world.

If it is wanting, death ensues. If oxygen is present in insufficient quantities, the respiratory and other functions become painful.

This law of correspondence between the living being and its environment, so evident from a biological standpoint, is identically the same from the sociological; only, in the latter case it is more complex, for the life and happiness of the individual should not be a hindrance to the life and happiness of society, nor *vice versa*. This principle might be expressed thus: the individual ought to live under the right conditions, ought to play in society the part best suited to it, to exist in the environment best adapted to it: and this rôle and this environment should both be such as would best profit society at large. In human societies, this double condition of a happy individual and a happy social existence is lacking in a vast number of cases; for the deadly strife of human egotisms and even the painful necessities of life often prevent its growth.

Science, then, should endeavor, by studying the peculiar characteristics of the individual, to find out what is, so to speak, the ideal rôle that the human being ought to play in the progress of civilisation; she should seek the essential conditions required by them for their life and happiness—conditions sometimes destroyed by the exigencies of life, but the realisation of which is the aim and object of progress. All applied sciences which have as their end the practical and useful, such as medicine, pedagogy, psychology, and ethics, labor to search out and discover those natural conditions of life and happiness from a physiological, psychical, and sociological standpoint; in doing this, they trace out an ideal plan of conduct, they offer rules, absolutely true, but which can only be approximately observed. The ever advancing and complete obedience yielded to these rules is the measure of the ascending march of civilisation.

The essential condition of feminine existence, which I desire to analyse in this paper, is that which I shall name the Law of *Non-Labor*. As it is a natural law that the man must labor and struggle to live, so is it a natural law that the woman should neither labor nor struggle for her existence.

Biology clearly shows us, that the physiological prosperity of

species depends on the division of labor between the sexes, for in exact ratio to this is the duration of life. This is the result of natural selection. When the female is not helped and sustained by the male in the struggle for life, it is important, in fact almost necessary, for the species, that the female shall accomplish her work of reproduction with the greatest possible speed and immediately thereafter become extinct. For example, it is evident, that while the female insect is busy laying her eggs, she cannot defend herself from the attacks of enemies nor can she procure for herself the requisite nourishment. If, thus, unassisted by the male, she accomplishes the work of reproduction in the shortest possible space of time, her species will have greater chances of survival, for the shorter the normal duration of life, the fewer the probabilities are that an enemy or any other unfortunate accident will destroy the female before she has fulfilled her duty towards the species.

It is thus that in the lower orders of creation, where the division of labor and mutual aid of the sexes does not exist, the duration of life tends to be reduced to a minimum ; for individuals that develop quickly, and quickly die, are more likely to leave descendants than such as do not.

Facts bear out this assertion. Insects among whom this division of labor and association of the sexes is only exceptionally met with, are short lived. Most diurnal butterflies live but a month, and of nocturnal insects of this class there are several, for example, certain *Psychidæ*, who live only a few days, and some that live only twenty-four hours. The females of *Gryllotalpa* only live a month, those of *Locusta viridissima* only four weeks after maturity ; and those of *Lycaena violacea*, according to Edwards, three or four weeks at the longest. As for the parthenogenetic females of *Selenobia triquetrella*, the duration of their lives barely exceeds one day. So it is with many other species of *Selenobia*. The female of *Melolontha vulgaris* does not appear to live longer than forty days. It is also true of the *Ephemeridae*, so called because they are born, love, and die in a day, "whose flight," says Rössel, in speaking of *Ephemera vulgata*, "begins with the setting sun and terminates before midnight, the moment the dew falls."

Sometimes this brief life is preceded by a very long preëxistence in the larva. Thus, the larva of the cockchafer feeds four years on the roots of trees, before it passes into the beetle stage of its existence. And this state, lived under such restrictions, this complicated body, when it attains complete maturity, has a very fleeting existence. The beetle dies a month after having quitted its chrysalis. Here, therefore, as we perceive, is an immense vital effort, culminating in a very short after-existence, due to the fact that the female not being sustained by the male and being obliged to shield herself from all the dangers of the struggle for existence, must expedite her specific work—the reproduction of her species.

We find, however, among insects one exception, which strongly corroborates our theory. Among bees, wasps, ants, and termites, the females live a long time. Thus, the queen-bee, the only perfect female in the swarm, often lives for two, three, and even five years. With regard to ants, Sir John Lubbock has succeeded in keeping females and workers alive for seven years—a remarkable exception of insect life.

But among these species we have a division of labor, not between the sexes, but between the females and the workers, the latter being neuters, male-females, so to speak. These attend to the nourishment and safety of the queen or perfect female bee, and consequently any great rapidity of reproduction and development is unnecessary. The life of the species is thus prolonged, and its physiological prosperity increased. If we are still in doubt as to whether this prolongation of life is due to a division of labor between the sexes, we have other conclusive evidence of it in the following fact: that the probable ancestors of bees and ants, the *Tenthredo*, who, like the other insects, possess no division of labor, enjoy but a very brief existence.

Up to this point we have spoken only of the short life duration of the female. We will now go a step further and remark that the absence of this division of labor is not only prejudicial to the female, but also to the male, who, in the greater number of cases lives a still shorter life. The males of the singular little parasites of the bee, called *Strepsiptera*, live but two or three hours; whilst their

wingless females live about eight days. The latter, therefore, live about sixty-four times as long. The males of *Phylloxera vastatrix* are much shorter-lived than the females. This same phenomenon has also been observed in an order of life still lower than insects. The males of all rotifers possess neither mouth, stomach, nor digestive canal, and, consequently, not being able to feed themselves, must doubtless live a much shorter time than the females, who are furnished with a complete digestive apparatus. The same is true of the males of many crustacea and marine worms.

The explanation of this is easily given. When the male is not the defender of the female, when his existence is merely necessary for the conservation of the species, once this duty is accomplished, a prolongation of his life is of no practical use; whereas the female, having to lay her eggs and often to watch over them until they attain maturity, still retains her usefulness to the species, and must necessarily live a longer space of time. But when the male has to fight the battle of life in defence of the female, her existence being thus prolonged, that of the male, by virtue of the law of natural selection, must also be prolonged, for it is necessary to the preservation of the species that he should live as long as she does, in order to protect her. Thus we have noticed that the workers among bees and ants live as long a time as the queen-bee

It is, thus, division of labor between the sexes that prolongs life in the lower animal world.

* * *

I have described in great detail the relations between the sexes of the lower animal orders, for we can there observe in a clearer and simpler manner the principle which I wish to set forth for the higher, that the prosperity of a species increases, in exact proportion to the degree in which the male frees the female from the burdens and anxieties of life. But this law also exists among the higher orders of animals, although by reason of the complex and innumerable factors which govern the latter's existence its action is here not so easy of analysis.

Among the birds we find marriage, which is a perfected form of the division of labor and mutual coöperation of the sexes. A pair

live together for years, sometimes for life. During their nesting-time the male bird provides food for and defends the female while she hatches her brood. At other seasons, the female helps the male in the search for food, but the guidance of this struggle for life, so to speak, falls always to the lot of the male. The male and female eagle hunt in pairs, but her duties are merely auxiliary. She spies out the victim and announces its presence to her mate. It is owing to this division of labor that birds multiply so fast and are so numerous all over the world, in spite of so many destructive enemies. And among species where this coöperation is less observable, we note a remarkable diminution of number. So, among swallows, if the hatching-time lasts very long, the males often abandon the females, who are forced thus to seek their own food, and this is the occasion in certain years, says Brehm, of a wholesale destruction of their eggs.

The lion and the hyena, during mating-time, hunt only in order to provide food for the female, who remains passive: sometimes the lion, with true chivalry, will not begin his meal until the lioness has satisfied her hunger on the prey he has provided.

In the monogamic and polygamic families of monkeys it is always the male or chief who guides the troop, who watches for the enemy, who opens the march, who advances courageously upon the adversary that threatens his family, while the female climbs the trees. Here, both male and female seek the food, for subsisting as they do, on the fruits and foliage of the forests in which they live, they have only to stretch out their hands to gather without effort their daily food.

Among savages we find that the struggle for life, that is to say, war, falls to the lot of the man; but labor, and that of the most painful kind, is the portion of woman. Woman builds the dwelling or hut; she it is who ploughs the fields, carries the burdens, and among tribes that dwell on the borders of the sea, lakes, or rivers, sometimes rows or fishes. She is the slave, the beast of burden, on whose back is cast the weight of the heaviest and most fatiguing labors. But this is merely a passing phase, a very dangerous aberration, produced by the excessive selfishness of man, which does not

and cannot last long. When M. Letourneau said that the degree of civilisation of a nation could be estimated by the condition of its women, he enunciated a profound truth; but there is yet another and more important side to the question. Those natives among whom this most abnormal and unnatural condition of things still prevails have remained in a savage state and have made scarcely any progress whatever. In fact, many travellers and ethnographers have remarked that among certain savage tribes whose mental endowments were above the average, a very strong obstacle to progress was exactly this excessive labor of the women and the idleness of the men. The men attending only to the duties of the chase and of war, nothing was brought to a state of perfection except the weapons of war; for the women, constrained to plough the earth, to make pottery, etc., neither could nor would work for the amelioration of the products, this not falling into their domain. If labor effects anything in savage woman, it is to increase the maternal sentiment. Obliged as she is, to undertake heavy and arduous labors, and full of love for her offspring, the savage-mother invents an infinity of artifices, whereby she may make her toil lighter and fulfil her duties towards her children. Who has not seen in some ethnological book the picture of a negress, ploughing the fields, while she carries her infant in a kind of sling on her back? We find many such inventions among savages; sometimes we even meet with physiological and morphological modifications—among the Hottentots, for instance. This proves that by relegating to women the work of agriculture and so forth, we do not contribute to the perfection of agriculture or of any industry, but simply to that of the maternal sentiments and what pertains thereto.

It is a more difficult matter to prove that the labor of women among civilised nations is unnatural; for it is so recent a phenomenon that the harmful results which all unnatural conditions of life produce are in its case still difficult to demonstrate. We will observe first, that female labor is not at all necessary for the production of sufficient wealth to supply the wants of humanity—men, women, children, the old, and the sick. Man alone could do this. Woman-labor is not required by the necessity of an increased production. It

only tends to lower the marketable value of male labor; for, while woman is working in the factories, there are everywhere, and especially in Europe, crowds of men vainly seeking employment, to whom the cessation of work is an oft recurrent and terrible evil. This shows that even from a sociological point of view, female labor is a pathological phenomenon; for it does not result in the common labor of the two sexes, in itself a bearable evil, but it leads to the enforced idleness of men and the merciless toil of women, entirely overthrowing the relation that nature has established in all orders of life below us.

Perhaps, on physiological grounds alone this principle could be enunciated. Statistics show us an increase of mortality among women and children in countries where industrial life has pressed mothers into its ranks. In Italy, where women are employed in the rivers, the mortality is often startling, particularly so among the children. I do not wish to encumber this article with tables of statistics, so I shall refer the reader to the works of hygienists. But all must know that the life of a factory-hand is the most dreadful imaginable, above all when she has young children. Maternity is a labor of love for women, yet a very exhausting one; add to this the strain of factory life, the moral anguish of a maternal love which can be satisfied only for a few brief moments each day, and the family cares which press more heavily on a woman on account of her enforced absence from home, and we shall have a sum of suffering and misery sufficient to break down the constitution of the strongest woman.

Another reason why woman should not work is the fact, that we wish her to be to us beautiful and attractive, her whole person, her dress, manners, her ideas and her words filled with exquisite grace. Grace, said Guyau, is the feminine side of life, as strength is the masculine. A perfect woman should be a *chef d'œuvre* of grace and refinement, and to this end she must be exempt from toil. As the human form, and above all the expression of the face, are only the product of the emotions which an individual oftenest experiences, a woman can only be beautiful and graceful in person in so far as the greater proportion of her emotional experiences are sweet, tender, and peaceful. This is a theory that Mr. Bain has developed

with great fulness and clearness. But the emotions which toil entails, in the struggle for life, are violent and strong; anger, hatred, enthusiasm, boldness, courage, these may impart strength and grandeur to the individual, but they can never endow her with the attractiveness of grace. The workingwoman grows ugly and loses her feminine characteristics, she loses what is most exquisite and æsthetic in woman.

I foresee here many objections. It is man, you say, who desires grace in woman; it is but another proof of masculine egotism, thus to foster idleness in woman, in order that she may become that which he specially desires; do not let us dignify as a natural law, what is but the outcome of masculine psychical tastes and habits.

I believe this to be a mistake; grace, in woman, is not merely the product of caprice and selfishness in the man who chooses the prettiest woman because she touches his sense of the beautiful. Grace plays a far higher rôle in the social and psychical evolution of humanity, it is an ever active and moral force, always beneficent, the fruits of which are far greater, than could be produced by any labor by woman. Womanly grace and the love which men bear a beautiful woman, have perhaps been the origin of paternal love and of all the other sweet and tender feelings of which the male is capable.

Grace is the æsthetic side of weakness, and since man seeks this quality in woman, it follows by the well known psychological law of association, that the perception of grace and the sweet emotions of love become more closely connected the more psychical progress increases. Once this combination is fairly established, all graceful and pretty things, by reason of this law, awaken the emotion of love, feebly, yet in a sufficient degree that all pretty things, be they human beings, natural objects, or artistic productions—give us pleasure; and this pleasure is only in a lesser degree a reproduction of the pleasures of love. But grace, as we have just said, is the æsthetic side of weakness. Hence, the association between the emotions of love and the perception of grace, becomes stronger, it extends itself from graceful things to weak things, for at certain times, almost all weak things present themselves to us under the

æsthetic aspect of grace; so that as the association between these two sensations widens, it becomes an association between love and weakness. Weaker creatures, for example, young children, who are *par excellence*, the weakest of all beings, awaken in us a profound sympathy, which is but a rush-light in comparison with the intensity of the flame of sympathy which unites us to woman. We find then that physical grace in woman is a beneficent sunshine, calling into bloom the softer emotions of man. It would be a great misfortune were this sunshine to be overclouded.

It may here be objected that if woman be prevented from taking a share in the struggle for daily existence she will be destined to remain forevermore the slave of the sterner sex, and will not benefit by the fruits of that civilisation which has been more particularly the result of man's work. This is not so. The truth of the statement, that toil is not woman's natural condition, is proved by the fact that she does actually now reap the very benefits, in the production of which she has not coöperated. If she attains that supreme end, the bettering of her condition, without having to labor for it, it is unnatural to suppose she should spend her substance, physical and mental, in laboring for what she may gain without any effort on her part.

We hear a great deal about the slavery of woman; that she is always the victim of a despotic master, who makes her submissive and obedient to his will. These statements are but so many exaggerations, true only in the remote and barbarous ages of humanity. Woman, more than man, enjoys all the benefits of civilisation, which nevertheless have been in great part acquired by him alone.

Glance for a moment at the condition of woman as it used to be among savage tribes and among the barbarous ancestors of civilised nations; compare it with her condition now in the highest centres of the world. What an advance! What a marvellous transformation! Among savage tribes woman works harder than the beast, performs the most sordid drudgery, she is ill-fed, relegated to the most uncomfortable and ugliest parts of the dwelling, is beaten, roughly treated, killed, and even eaten, according to the whim of

her master. She is in very deed a slave, having neither the right to live, nor to be happy.

Among civilised nations, though we do not deny that she is still the victim of certain oppressions and injustices, yet woman is not obliged to toil, except in those countries where large manufacturing interests have produced a transitory regression among the working classes. She is respected and ardently beloved by man, who often works with dogged resolution to win a wife and the supreme joys of family affection; she finds in man a protector, who is glad to procure for her æsthetic enjoyments, elegance in her person and surroundings, mental gratifications and rural pleasures, making her life sweeter and brighter, more charming and happier. Of course, all these luxuries with which man surrounds woman are to be found to-day only among the wealthier classes. But if the poorer classes are not able to do as much, it is merely from inability, and not from want of will; for it is the height of ambition in every normal man to better the condition of his wife and children, to spare them fatigue and suffering, and the daily scars that are gained in the deadly struggle for life. Though despotic husbands still exist, it does not prevent woman from being in very many cases the little queen of a more or less extended empire, surrounded by homage, veneration, and love.

Now, can it be said that man's condition has improved as much as woman's? I think the reader, if he will consider it for a moment, will answer this question, which no one yet has thought of asking, in the negative. Once woman had to toil like the beast of the field; she was a victim at the mercy of a tyrant master: to-day she is exempt from labor just as soon as the financial condition of the family allows of it. She is generally surrounded by care and affection. Man labors and toils to-day, just as he did of old, and there is nothing abnormal in this fact, for it is his positive duty. But the progress of civilisation should at least have rendered his labors lighter and easier, and he should have earned a certain amount of leisure, which he might devote to superior and intellectual work, such as would ennoble and elevate him. Can we say that either mechanics or science has yet accomplished this miracle? To-day, in all classes of

society, man has to work more energetically than ever before; the struggle for existence has become fiercer; the effort he has to make in order to conquer, or, at least, not be conquered, in the race, is infinitely greater than that which sufficed a hundred years ago. We see this every day more and more, by the ever-increasing numbers of the defeated, suicides and lunatics, and by the maimed and wounded, those broken down in body and mind, nervous patients, etc., etc. Truly woman is happier in her present state than she was in her past, while man is preparing for himself innumerable other sufferings, the elements perhaps of some overwhelming future.

If, therefore, the natural outcome of facts proves that woman, though working in a far lesser degree than man, still benefits more than he from the effects of civilisation, this should alone suffice to demonstrate the unreasonableness of labor. Nature's great aim is the economy of forces. How absurd it is, then, that a human being should expend painful energy in attaining a certain point, when he can get to precisely the same point without any expenditure of labor at all.

This curious phenomenon, which up to the present day has neither been noticed nor analysed, proves that political questions are not of the slightest value to women. I cannot understand why the question of woman suffrage should so excite public opinion. It is entirely profitless to her; it is a weapon for which she has not the least need. At the outset of civilisation the political organisation was but a superstructure of the military organisation. As Mr. Spencer has so aptly shown, the chief or head was at once military, judicial, and political. His generals were his ministers as well as his judges; the political and judicial council, when it existed, was composed of warriors. The duty of government was to increase the military strength. It is evident that in this period of social evolution, woman, who is not in any way concerned with the defence of the nation, had no political interests to defend. State affairs did not concern her, or at least very indirectly, for politics are mainly connected with the means of conquest and defence. To-day, in this half-mercantile community, politics are an adjunct of finance and political economy, in which the antagonistic interests of the

various classes thrive together; here, women have little or no interest. Does the wife of a manufacturer have much interest in the election of delegates, or in defending the interests of the class to which her husband belongs? If her husband strains every nerve already to provide her with all the luxuries of life, he will certainly not be lax in defending those interests which are identical with those of his family.

We could more easily understand the necessity for woman suffrage, if the sex had particular rights of their own to uphold, if women were a separate class; but as the rights of every woman are riveted, so to speak, to those of her family, and as those interests are already protected by men, there is no sense in involving women in these bitter and fierce polemics, where so much good blood is spilled; they, who should lead a sweet and calm existence.

But, it is said, women do have their own particular and separate rights, rights which the excessive egotism of men—the lawmakers—entirely neglect. The legislators, themselves elected by men, frame laws with reference simply to their own advantage. We hold that it is mere delusion to say that woman's social conditions are dependent solely upon the laws; they are the outcome of the habits and customs of nations, of which laws are merely the ratification. No matter how excellent a law may be, it goes for naught, if it is in direct contradiction to the habits and customs of a country.

Let us suppose, for instance, that among a savage tribe, where women are treated like slaves, a great-hearted and wise king should promulgate a decree, commanding an equality of sex; do you suppose it would alter the existing state of affairs? In no wise. It would remain null and void; it would have no more effect, than an edict commanding the cessation of a storm would have, upon the atmosphere.

But I have already pointed out, when a nation progresses in civilisation, its habits and customs react quickly and favorably on women; and man himself ameliorates the conditions of his companion, endows her with all the benefits which have accrued therefrom, without her having to put forth any exertion. What advantage, then, can be gained by participating in man's struggle for ex-

istence, when woman has only to wait until he places these benefits at her feet?

* * *

Gifted women of genius, possessing unusual intellectual qualities, have the right to labor like men. It is both a cruel and absurd prejudice which would deny the right to such a one, of crowning her noble efforts with glory, simply because she is a woman. But our laws like all other laws, are framed for the guidance of the ordinary, normal woman, in whose case labor is as much of an absurdity, as in the case of the ordinary, normal man it is a positive duty.

All toil is painful; civilisation is a heroic effort on the part of man to free himself from this yoke, or at least to make its weight lighter. It is a natural law, that mankind should strive to attain his ends by means which involve the least possible expenditure of energy. Is it not, then, in direct violation of this to say, that a being who can attain happiness without labor and enjoy a pleasanter social existence, should wear herself out in a life of unremitting toil which works injury to herself, to those around her, and to the whole social economy at large?

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FRANCE.

M. DE ROBERTY has been mentioned already in *The Monist* as an original thinker, capable of exercising an influence on the direction of modern thought. This eulogy does not appear to me excessive. I experience some embarrassment, however, in speaking of his latest work, *La Recherche de l'Unité* (The Pursuit of Unity), or rather I feel the difficulty of giving in a few lines a sufficiently just idea of it. The subject treated has so many sides that the fundamental conception runs an easy risk of appearing scattered and uncertain.

I will pose a few questions which embrace very nearly the substance of the work. In the first place, "Why is the human mind constantly seeking unity, that is to say, the one unique formula of the world and the spirit?" The most profound reason that can be alleged for it is drawn from our mental constitution itself. We always tend, by virtue of our logic, to pass from fragmentary knowledge to comprehensive knowledge, to bring the facts that we know more or less well into relation with a single fact which explains them or is considered to explain them. Our intellectual—I was about to say *volitional*—indolence becomes here the accomplice of our logical activity: we wish to economise labor, and we hope to find repose and satisfaction at the particular point where we bring our route to a close. A general explanation, however imaginary it may be, puts in a manner the world in our hand, and it seems to us then that we hold it in our power, in place of feeling ourselves drowned in the weltering chaos of things.

What have been the great stages of the monistic research? At

what positions has the human mind stopped in this effort which characterises all true philosophy? To the theological discipline succeeded metaphysical investigations, which gave birth to the three great syntheses of materialism, idealism, and sensationalism. These, moreover, almost immediately began to transform themselves, in proportion as the sciences yielded new elements of analysis; and M. de Roberty has shown us, in his preceding works, how positivism succeeded to materialism, improving upon it, criticism to idealism, and the philosophy of evolution to the great sensationalist tradition. He has also been able to show that these last types, and that is a remarkable sign, interpenetrate each other intellectually in all directions. They tend equally, in fact, to the identity of thought and the world. The unity that they realise bears, however, according to him, the indelible imprint of a supposition that goes beyond phenomena. Some bring up at the idea of a principle which vivifies and animates the world; others, at the phantom of an "Unknowable," which they relegate beyond the bounds of experience.

There remains, then, at the bottom of these systems a more or less explicit dualism. What is the precise signification of dualism? It corresponds, M. de Roberty tells us, to naïve experience, and is perpetuated by the ambition of differentiating the reason from the "object thought of." A singular fact has, he supposes, contributed to produce it, namely, the fiction of "limit" created by geometers for their own use.

In reasoning on quantity, a universal attribute of things, the geometers arrived at the notion of confines between the different parts of space; they created, by analysis, the surface, the line, the point. These imaginations, which were indispensable to analytic reasoning, in no way trammelled the flight of synthetic thought; and the mathematicians, moreover, corrected the idea of limit by the negation of that idea, the concept of the infinite. Now it happens that in philosophy the limitative notions—God, matter, spirit, essence, etc.,—give equal aid to the thinker in constructing his ideal figures; concept-limits place the mind, in this case also, in immediate contact with their negation, the infinite or unlimited. Unfortunately, what is simple in the mathematical order becomes an obscurity in the

brains of philosophers. The opposition of the finite to the infinite has taken among them the sense of a real antinomy, or even one pre-existent to the mind which had generated it. The noumenon, for example, opposed to the phenomenon, is a negative concept, that of facts which enter into no possible generalisation; but the very property is ascribed to it that it served to deny. The Unknowable reproduced in its turn the noumenon decried by the Agnostics, and we find thus everywhere a survival of the old dualism in this monistic research which does not attain its end.

What escape is there, in a logical point of view, from this difficulty created by our reasoning? M. de Roberty appeals from it to what he calls "the identity of contraries." There exists such an association among our states of consciousness that mental coherence obliges us to think that the Universe, considered in its totality, cannot simultaneously "not be" this same indivisible universe: and all that we oppose to nature as its contrary or its negation—God, Supernatural, Unknowable—finally resolves itself then into this same nature, unified, in default of our knowledge, by our ignorance.

But logical monism should to the end remain in accord with scientific monism. Experience, it is true, meets everywhere only plurality, more or less veiled by the abstractive processes of the mind. Unity and multiplicity are defined, however, in virtue of the psychological law of contraries, as two fluctuating forms, transposable one into the other, of one single and the same act of consciousness. "The rational monism of science and philosophy announces itself as a psychical or even a psycho-physical necessity, an imperious need that our faculties appease, precisely because they feel themselves astray, in the chaos of our sensations, and, later on, of our cognitions."

Man, I recently wrote, is an instrument attuned to the diapason of things. We must understand, writes also M. de Roberty, that quantity flows in the mind, at the same time that the mind participates in quantity and remains extended. A truly scientific psychology will carry back our "intellectual forms" to *form*, to *quantity*. Our ideas sum up and synthetise our conditioned sensations; "mental unity is experienced as a biological and physico-chemical bond."

Where the terminology of M. de Roberty does not satisfy me entirely, is when he speaks to us of the deductive integration which must replace in philosophy inductive differentiation. If philosophy limits itself to redescending the path of scientific inductions, to recapitulating them in its own language, it then truly employs syllogistic deduction, and formulates what logicians call an identical proposition. If, on the contrary, assuming an original function, it draws conclusions conformably to the general principles of particular sciences, and supports itself upon them in order to set in relief new principles concerning the order and law of the world, the formula that philosophy delivers to us always implies a verification to be made, and its logical procedure remains that kind of induction which is called a "provisional deduction." "We deduce always by hypothesis," Claude Bernard has very well said, "when we make an induction." Metaphysicians, in fact, have always wished to engage in deduction, that is to say, to pass from principles to facts by the path of pure reasoning. The essential question is, then, always to know what the principles are worth from which one sets out, and whether the basis of the inductions which furnished them is sufficiently broad and solid.

M. de Roberty himself declares that it is necessary to satisfy ourselves with a "purely logical" monism. Or, if not, he says, one would run the risk of drifting either into the transcendental monism of the conceptions of the past, or into the experimental pluralism in such great favor to-day.

But how can it then be denied that "provisional deduction" remains the true operation of all philosophy, and that, starting out from induction, hypothesis becomes at last positive and scientific?

* * *

Of a surety, a striking character of modern research is the increasing specialisation of studies, pushed even to the point of blinding the eyes and contracting the mind.

But it soon finds its corrective in the juster perception of the close subordination of facts which appears to us conspicuous in proportion as we penetrate into the detail of phenomena, considered

hitherto a little too much in the large. Patient analyses always end in leading to syntheses.

We have a remarkable example of this in the physical sciences, where delicate experiments have resulted in giving an intimation of the laws of chemical equilibrium, thanks to which the too profound distinction, so long accepted, between the phenomena called "non-reversible," of physics properly so called, and the phenomena called "reversible," of chemistry, is being effaced.

In the social sciences it may be said in the same manner that moralists and economists, by dint of working each from their own side, have thus come, nevertheless, to meet each other. Man, it is scarcely any more contested, is a moral animal because he is a social animal, and it finally appears no longer possible to abstract moral facts from social and economic facts.

The work of M. Emile Durkheim, *De la division du travail social* (On the Division of Social Labor), is conceived in this spirit, and the author has thence reached the point of considering the great economic fact, division of labor, as the instrument of the new morality, or, to say better, as the henceforth preponderating factor in the moral evolution of humanity, in the production of the moral phenomena which are to distinguish the societies of the future.

We see continually, he writes, that changes have taken place in the structure of society which have rendered necessary changes in morals. "Morality then forms itself, transforms itself, and maintains itself, for reasons of the experimental order; it is these reasons only that the science of morality undertakes to determine."

I wish indeed, and it would certainly be a great service to us, that he would indicate the sense in which these changes of structure take place, specify the reasons of an experimental order which cause morality, more precisely the law of right, to undergo a continuous transformation.

M. Novicow, of whom I have spoken here recently, has put in evidence evolution, in the various forms of the great struggle for existence; he has found, in the transition from the purely physiological or animal struggle to that which is economic and political, and finally intellectual, the reason of the more rational proceedings which

tend to regulate the life of men in society. What is most apparent to him is rather the political and economic aspects of social changes. M. Durkheim, on the other hand, is especially preoccupied with the moral condition of the individual, the penal law, and the phenomena of conscious solidarity. But he has taken the same trouble to discover a fact in virtue of which it varies, and this he supposes himself to have found in the division of economic labor. The transition from a solidarity which is "mechanical" or by "similitudes," to "organic solidarity," due to the division of labor, appears to him to furnish the explanation of the two movements, contradictory in appearance, which are taking place under our eyes, and by which the individual becomes at once more autonomous, and more closely dependent upon society,—at the same time more personal, and more united with others in a common interest.

This is perhaps but one way among many others of looking at things. But it is interesting, and every reader will know how to appreciate, in the excellent pages of M. Durkheim, what he says, for example, of the characteristics of crime and penalty,* of the inverse relations of repressive and coöperative law, etc.

The tone of his book is indeed a little easy and dogmatic; but one feels in it a sound logic and elevated tendencies, and it will not be work lost for the sociologists of the future.

Dr. Azam publishes, under the title of *Hypnotisme et double conscience, origine de leur étude et divers travaux sur des sujets analogues*, ("Hypnotism and Double Consciousness, the Origin of their Study and Various Works on Analogous Subjects,") several writings which had remained scattered in different collections. They are too well known for me to need speak of them, and the principal observations of Dr. Azam have been since republished in special works. But I wish to take occasion from this publication to recall the works and the name of an eminent physician of whom a new generation is in truth much too forgetful. I speak here of J. M. Durand (de Gros) better known by some under the pseudonym of Philips. Dr. Durand

* Crime consists essentially, for him, in an act contrary to the strong and definite states of the common consciousness, and he shows that all the characteristics of punishment are, in fact, derived from this nature of crime.

de Gros had made known in France ten years before Dr. Liébault the forms and applications of suggestion. His *Electrodynamisme vital*, etc., dates from 1855; his *Cours théorique et pratique de Braidisme*, etc., from 1860. And not only did he treat of suggestion in his works on physiology, psychology, and pathology, but he had perceived also, and expressed in a very clear manner, the principle of the plurality of consciousness, or of psychic centres, illustrated since by Messrs. Pierre Janet and Binet, among several others.

In some *Essais de physiologie philosophique* (1866) did not M. Durand de Gros employ already these significant terms "Unconscious acts of the relational life, the product of the activity of spinal souls; cephalic souls, spinal souls, ganglionic souls; automatism of the soul; instinct or automatism of the congenital soul," etc.? In a very spirited brochure, written in response to a honeyed and rather perfidious report of Dr. Chauffard on the *ensemble* of his theories (*La Philosophie physiologique et médicale à l'Academie de médecine*, Paris, G. Baillière, 1868), he declared forcibly that the doctrine of an irreducible soul could no longer satisfy us, "that the human being is in reality a collection of organisms, a collection of distinct lives and egos, and that its apparent unity lies altogether in the harmony of a hierarchic whole whose elements, approximated by an intimate coordination and subordination, bear nevertheless, each in itself, all the essential attributes, all the primitive characters of an individual animal."

Let us do justice to the initiators, to the combatants of the first hour. They carry in them the scientific posterity which does itself sometimes the grave wrong of neglecting them, of passing over the name while entering into the inheritance.

I will only stop to call attention, in conclusion, to the third volume of *l'Année philosophique*, published under the direction of M. F. Pillon. It contains a study by M. Renouvier on Schopenhauer, an article by M. Douriac on the nature of emotion, another by M. Pillon on the historical evolution of idealism, and finally, the French bibliography for 1892.*

LUCIEN ARRÉAT.

* The books mentioned belong to the Librairie F. Alcan.

CRITICISMS AND DISCUSSIONS.

LOGIC AS RELATION-LORE.

REPLY TO MR. FRANCIS C. RUSSELL.

Mr. Francis C. Russell has devoted several pages in *The Monist*, Vol. III, No. 2, to discussing with evident sympathy the reflexions which in 1891 I presented to the readers of the French *Revue Philosophique*, concerning the theory of relations and its application to the concept of mathematical equality.

While approving the spirit that has inspired me, Mr. Russell has nevertheless formulated a large number of criticisms. Indeed, he accepts scarcely any of the data of my work, and he wholly rejects the results thereof. If these criticisms found their origin in a point of view different from mine, I should certainly abstain from making any reply thereto. Any controversy upon any special subject, when the parties thereto differ already as to the manner of treating every subject, is wholly lacking in interest. In virtue, perhaps, of the principle of contradiction, it is only apt to confirm each one of the contestants as to the merits of his own theory. But such is not here the case. It appears to me that between Mr. Russell and myself there exists a certain community of view, which makes discussion possible and even profitable. Besides this, the observations of Mr. Russell have, I believe, their main occasion in certain misunderstandings, arising in part from my honorable opponent not having perhaps gained a sufficiently intimate acquaintance with my article (which would be very natural, since a review article is not one of those productions one is apt to look into very deeply), and, doubtless, also in part from a lack of precision and lucidity in the explanation that I have given of my ideas. I am thus justified, I think, in continuing the debate.

Without wishing, however, to enter into a complete discussion, one that would go to the bottom of the subject, and in order also not to abuse the hospitality which the good-will of Dr. Carus has accorded to me, I will content myself with correcting the misunderstandings, which I consider the results of erroneous interpretations of certain points of my article. This will be for me, moreover, an occasion for putting more in relief what I hold as fundamental in the theory of cognition, but in so

far only as it relates to the cognition of the relations between things and to the exclusion of the theory of the cognition of the things themselves.

I. THE AXIOM OF SYMMETRY.

And in the very first place I ought to separate from the theory of cognition the questions relative to the validity of the Axiom of Symmetry.

After having remarked that every philosophic theory is founded upon some very general supposition, taken as established, Mr Russell declares that the general supposition upon which the theory which I maintain is founded is that axiom relative to symmetric relations (I mean those having no determinate *sense*, or convertible without alteration), which I have enounced as follows:

'Two things which have the same symmetric relation to a third thing, have between them that same relation.'

This understanding of Mr Russell is most certainly unfounded, and I must disavow it. I have undoubtedly tendered the axiom in question as a fundamental one, that is to say, in respect of placing myself at the scientific point of view, at the point of view not of conceivability, but of reality. In this sense, the axiom is certainly one of the most general laws of exterior phenomena, but it does not follow that in logic its part is an essential one: it is merely a rule of simplification. For instance the axiom permits us to reduce certain complexes of relations that are known primarily as having three or more determinate terms to two determinate terms; but should the axiom be in fault, the complexes of three terms or more would none the less preserve its conceptual value.

If, then, the axiom of symmetry is one of the objective laws that permits of abstraction, that is to say that enables us to simplify our cognitions in so far as the same consists in the classification of exterior objects, it is in no manner or form one of the principles that govern the development of our cognitions. So well able would I have been to suppress all mention of it without doing any violence to the theory which I maintain, that it would have been sufficient for me in the concrete examples to substitute for the axiom of symmetry the special laws of each science; laws which are formed by us no matter what rank is accorded them; laws of which the axiom itself is only an abstract enunciation, common to all, but unable to oversee them.

After having thus wrongfully imputed to the axiom of symmetry a fundamental rôle in my theory, Mr Russell contests its generality, from whence follows the natural conclusion, the however, which he has not brought forward, that my theory is unsound.

It is plain that we cannot consider the generality of the axiom as established so long as it has not been verified in every case of that generality. I am too much the adversary of 'given certitude and natural verities' to dream of imputing to the axiom any transcendental virtue.

But the examples that Mr Russell has cited as implicating it do not appear to

me to be of a nature fit to confirm his opinion. I beg leave to discuss them briefly, in virtue besides of the purely scientific interest that attaches to the question

One of these examples is borrowed from the solar system. Mr. Russell holds that the planets ought to be considered as being in equilibrium with the sun, without, (as the axiom would have it and since equilibrium is a symmetric relation,) being in equilibrium with each other.

It is certainly a scientific error from the dynamic point of view, abstraction being made of the initial velocities, to consider the rôle played by the sun in the system composed of the sun and the planets to be different from the rôle played by the planets, the single distinctive peculiarity of the sun in the case being its relatively enormous mass, and, in consequence thereof, the closer proximity of its centre of gravity to the centre of gravity of the entire system.

But that is only a difference of degree, not of nature. In reality, the only symmetric relation which I perceive between the planets and the sun is not the relation of equilibrium, it is the relation of mutual attraction, such as was discovered and defined by Newton. So far from the planets being in equilibrium with the sun, they fall towards the sun each instant, abstraction being made of their initial velocities, and at each instant the sun falls towards the planets. But the same can be said of two planets, as related each to the other. There exists a mutual attraction between them, like that between each one of them and the sun. The example of the solar system does not impugn the axiom of symmetry, it is, on the contrary, a confirmation thereof; perhaps the clearest and simplest.

The same may be said of the geometric example invoked by Mr. Russell, who convinced *a priori* of the futility of the axiom, has not taken good care to weigh all his objections. "The distance of points from each other," says Mr. Russell, "is a "symmetrical relation, and yet point A may be from point C the very same distance "that point B is from C, but the distance of points A and B from one another may "vary from coincidence to double the distance $AC—BC$."

It is easy to reply to this objection, which can be interpreted in two ways. If the nature of the symmetric relation that Mr. Russell contemplates is the equality of lengths, the axiom of symmetry is alien to the question, since it supposes two symmetric relations as given, while in the case made only a single relation of that kind is given.

If he refers simply to the relations of relative position, or to the coexistence of two points in space, the axiom is satisfied, because two points which coexist with a third, coexist with each other.

If, lastly, the two points A and B coincide, we are no longer in condition to apply the axiom, since the same requires three distinct terms.

There remains a third example, drawn from the ethical domain; namely, "mu- "tual friendship is certainly a symmetrical relation, but A and C may be mutual "friends, and B and C mutual friends also, but it in no wise follows that A and B "are friends."

This objection, at first blush, appears embarrassing. It will evidently not suffice to answer in the words of the proverb, that "the friends of our friends are our friends," for a proverb is not an axiom. Since all the embarrassment here is due to the complication of the relations considered, I am going, as a preliminary, to examine two cases, which have some resemblance to the present case, but which, being borrowed from geometry, offer more simplicity.

There is, to begin with, this case. Let there be three polygons, P, P', P''. The side α of the polygon P is supposed equal to the side α' of the polygon P', and the side β of the polygon P is equal to the side β'' of the polygon P''. It is evident that the two polygons P and P', being such as might have a side in common, are in virtue thereof connected by a symmetric relation, and that the same kind of a relation exists also between the polygons P and P''. If the axiom of symmetry is true, Mr. Russell would say similar relations ought to exist between the polygons P' and P'', and since we know that such is not the case and that these polygons are by no necessity such as must have any side in common, it would seem that the axiom of symmetry is here at fault. The truth is, that it is not applicable. The axiom supposes only *three* terms or two *conjoint* relations, and in the case considered, there are four terms, α, α', β, β', and two *disjoint* relations, $\alpha = \alpha'$ and $\beta = \beta'$. In order for the axiom to be applicable, it would be necessary that the two relations should have a common term, which can only obtain if, say, $\alpha = \beta$, and then we would find ourselves brought back to an application of the axiom of Euclid with regard to equality.

We see, therefore, that before we can apply the axiom of symmetry to the relations subsisting between a set of component terms, it is necessary, in the first place, to ascertain that one of the several terms, which enter directly into those relations as essential, should be identically the same for one and another of the relations given. In any other case we would be in error in considering the relations as conjoint. We can only say that the axiom is true of simple determinate terms which cannot be decomposed without disturbing the relations that connect them.

The second case is also borrowed from geometry. Two symmetric *figures* in virtue of that very symmetry, are certainly connected by a symmetric relation, and yet we know that two *figures* that are symmetric with a third figure are not symmetric with each other.

If the axiom of symmetry still appears faulty, it is not because the relations considered are disjoint; it is because it is applicable only to simple relations that subsist between two determinate terms, while geometric symmetry is a relation involving three determinate terms, namely, the two figures considered and the point, axis, or plane, of symmetry.

We can now, by way of analogy, attack the complex case cited by Mr. Russell, and show why it is that the axiom of symmetry is not applicable. And in the first place, a person, a being, is not a unity, objectively considered, and as for moral personality, it is a very complex whole of various manifestations; subjectively, no more is the unity realised, and the researches upon hysteria have conclusively proved

the theory of Hume that every mind is a loose or a more or less compact tissue of sensations, ideas, and emotions, sometimes even broken up and dispersed, if not even a tissue of sensations and simple relations between sensations. So from two points of view we may compare beings to sorts of moral polyhedrons, situated in a space of an indefinite number of dimensions, and formed of a quasi-indefinite number of faces in process of perpetual deformation.

Thus, relations of mutual friendship correspond to the possible fact that in the midst of these incessant transformations there is frequently between the two moral polyhedrons considered certain determinate faces in common. We can well understand by this figure that a mutual friendship does not directly connect two beings, but only certain of their manifestations, or certain of their hypothetical states of consciousness. Friendship connects persons in this only, that their manifestations or their states of consciousness make up an integral part of their personality. Frequently the manifestations α, under which appeared in C the friendship which connected him to A, are different from the manifestations β, which connected him to B. The faces common to the moral polyhedrons A and C are not, then, the same as the faces which are common to the polyhedrons B and C, and hence the polyhedrons A and B have not of necessity any faces in common, and the beings A and B are not of necessity mutual friends. But, as I desire to show, this does not impugn the axiom of symmetry. The conditions that it supposes are not fulfilled.

In the second place, in order to make definite any special relation of mutual friendship, it will not suffice merely to point out the two determinate persons connected by it, it is necessary also to show its *determinate* foundation, which is almost always a community of tastes, some common passions, some moral trait. In short, mutual friendship is a relation of three or more determinate terms. It is a sort of geometric symmetry, the quality in common here playing the rôle of an axis of symmetry. There exists also an infinity of kinds of relations of friendship, and the axiom of symmetry cannot rationally be applied to a case where the two relations given are of different sorts. For example, William, who is fond of hunting and fishing, has for friends, John, who is fond only of hunting, and James, who is fond only of fishing; but John, who is afraid of rheumatism, and James, who dreads the fatigue of walking, have not by reason of these connexions with William any cause to connect themselves with one another.

In the third place (and really I find myself led nearly to the making of a scientific course of ethics) in the relations of moral and social order large account is to be taken of the complications which oppose the realisation of the possible relations.

We know that in mechanics, in chemistry, in physics, such complications intervene in a great number of cases and falsify the results that we would have the right to infer if the bodies were always able to obey the mechanical, thermal, elastic, or electric forces that influence them. In the dynamics of persons the same is the case, but the complications are besides frequent, complex, and extended. Liberty, that is to say considering merely the mental complications that restrain activity, is

as little to be realised as is the absolute zero of temperature or of electric tension. Tyranny and the immorality of governments, the conflicting appetences of individuals, the contradictory passions of the individual himself are so many complications which conspire to restrain the human activity. It is only upon rare and transient occasions that the manifestations of any person are conditioned and governed by his own proper activity independently of the excitations or the restraints due to alien activities. We can sometimes observe such occasions but we can never produce them in their full estate, and thus many of the particular relations that are possible escape our notice.

All which being duly considered, that which we observe, that we call a relation between persons, is not the relation itself, it is its realisation, that is to say, the effective repetition of the facts upon which it is founded. Or a true relation, or at least the true notion of a relation, does not consist in the facts but in the prevision of the facts, those facts which emerge if A and B are brought together under certain determinate conditions, which conditions are, however, seldom realisable. Hence this conclusion follows, that in the study of the laws of moral science and of sociology that which is necessary to be considered if we wish to discover the actual laws we are seeking, are not the too complex facts of habitual observation but the simple facts which emerge if the conditions of solidarity are satisfied, and if the interior complications of the system considered are neglected. It is in this sense that we must understand the observation of Stuart Mill, that the sciences in question can be treated only by means of deduction. It is in this way that we are able and that we ought to regard those relations that while inaccessible to observation are, however, the real elements of the relations that are actually perceived.

For example, the *community* of tastes, the foundation of their mutual friendship is the same between William and John as between William and James, still if the circumstances are such that John and James do not happen to meet, or if there exists between the two an enmity arising from the opposition of their interests, it is evident that John and James may never become friends, or, in the latter case, may continue to dislike one another cordially, while at the same time loving William the common friend none the less. Nevertheless, we should by application of the axiom of symmetry infer a relation in the logical sense of the word between John and James. That axiom signifies, indeed, simply that certain manifestations occur if such and such conditions are satisfied. It does not signify that those manifestations actually occur.

To resume, I think I have shown that the axiom of symmetry, which I am not alone in enouncing, but which has often been invoked under various forms notably by DeMorgan ("Memoir," IV), is not undermined by the examples that Mr. Russell offers to me. But in order for it to be applicable it is necessary that the following conditions should be fulfilled.

The relations given must be two in number, neither of which has more than two entirely determinate terms opposed in sense to each other. The relations must

be symmetric and possess a common term. If this common term is complex the two relations must refer essentially and exclusively to the same determinate common element.

All this can be summed up briefly by saying that the terms of the axiom are distinct, irreducible, and three in number, oppositely arranged in pairs by the same sort of relations independent of *sense*.

I may as well add that the axiom of symmetry is only a particular case of an axiom still more general which I have called the "axiom of the three senses," and which I have specially examined in a paper upon the "Le sens de l'inégalité" (*Revue Philosophique*, No. 197).

As regards this paper Mr. Benj. Ives Gilman has, with a luxury of symbols to my mind perfectly useless, taken the question up again in an article (*Mind*, New Series, No. 4) of which *The Monist* of January, 1893, contains a brief analysis. I am glad on this occasion to join in testifying that the fundamental principles which enable us to simplify and unite our objective cognitions are beginning to win for themselves a recognised place in the sphere of the philosophic studies.

II. SPENCER'S PRINCIPLE.

It is an error, in my judgment, for Mr. Russell to give the name of Mr. Spencer to the axiom of symmetry. Mr. Spencer has enounced a principle which is as follows: "Two things which have a definite relation to a third thing, have a definite relation to one another." But this principle of Mr. Spencer is distinct from the axiom of symmetry. It is completely separated therefrom by its more general object, by the nature of its conclusion. and by its subjective origin.

By its object.—The principle of Mr. Spencer refers to any two conjoint relations; the axiom of symmetry refers to two symmetric relations exclusively. The principle of Mr. Spencer is unqualifiedly general; the axiom of symmetry touches only a particular case.

By the nature of its conclusion.—It follows from this first point of distinction that before applying the axiom of symmetry to any particular case, it will be advisable to apply to it the principle of Mr. Spencer. This principle then makes known to us that between two things connected to a third thing by a symmetric relation there exists a certain definite relation, but it makes known nothing further. It does not make known the nature of that relation, which is completely definite the moment that its relational elements are given. The axiom of symmetry adds another conclusion to this first one because it tells us that between the two things under consideration there exists, beyond the new relation that has just been spoken of and defined, a symmetric relation which is *of the same nature* as are the symmetric relations given. The first relation inferred is made definite *by* these, but the second relation is certified as the *same* as these. In practice these two kinds of relations become confused together or rather the first one escapes notice so that the same has not received any special name.

By its subjective origin.—The axiom of symmetry expresses a fact of experience, a conclusion that is not contained in the premises, and of which the negation can without difficulty be conceived. The proof of this is the very objection of Mr. Russell, who not only conceives this negation but affirms the reality of it. The principle of Mr. Spencer is, on the contrary, a condition of conception. We cannot even conceive that it may be not true. In the language of Kant we might say that the principle of Mr. Spencer is analytic and that the axiom of symmetry is synthetic; I prefer however to say that the former is a law of thought and that the latter is a law of nature *

As a corollary the principle of Mr. Spencer borrows nothing from the axiom of symmetry and that axiom may be found defective without compromising the exactitude of the principle

III. MY THEORY OF RELATIONS.

The true point of departure of the theory that I have given of the nature of concepts is not and cannot be the axiom of symmetry since that is a simple objective verity which does not directly concern the mode of the development of cognition. The point of departure is the principle of Mr. Spencer or rather its reciprocal about which Mr. Spencer has not spoken.

Generalizing its principle to begin with we may say that every complex of relations constitutes a new concept. Then I go still further and reversing the conclusion I have given this new and fundamental principle.

Every concept of any relation is made up of a complex of relations.

This principle is precisely scarcely advanced as to the point of view of the analysis of ideas. If the relations which enter into a concept resolve only in functions of the concept itself it is analyzing any given notion we must after a course more or less extensive return again to the same notion we will thus only go round and round in a circle. But I have added the second fundamental principle which overcomes the difficulty.

The power of analysis contained in the first principle is increased one unit if it is in a certain sense—infinite not determinate.

There is a point of fact in ascending *a priori* from the particular to the general and a descending *a priori* from the general to the particular and in each sense the same concept is once only to be encountered. Every concept occupies in the general series a definite and determinate position. We are thus able to say that every concept is derived from concepts that are more simple and more directly known and itself gives birth to concepts that are less simple and less directly known. As a corollary we must also notice that every concept is simpler in a single logical lati-

* Between the principle and the axiom there is the same kind of an opposition as there is between a notion and a law of connection upon which I have insisted in referring to the articles of Mr. Sommerlad (Mind, [illegible]) and Mr. Russell (Mind, [illegible]).

nition, a truth too often overlooked, thanks to the perpetual metaphysical confusion between notions and things, between cognition and its objects.

I have ended by this third principle, not less fundamental, which has been known ever since the time of Aristotle, and which DeMorgan was one of the first to restate in a scientific form, that is the principle of relativity, namely:

Every concept supposes another one which is opposite (in nature) and single; each one of the two contrary concepts being defined by the negation of the other in the relational complex constitutive of a more general concept, one relation being affirmed by the opposite concept, and inversely. That is to say, to borrow a common image, that the tree which represents the development of cognition and whose roots are our states of consciousness, does not ramify in whorls, but only in dichotomies.

These three principles of logic or fundamental laws of thought (entirely distinct from the scholastic tautologies known under the same name) the principle of constructivity, the principle of logical evolution, and the principle of relativity* cover the entire subject.

It is convenient to separate them from the subsidiary conditions, those of coexistence and of solidarity, whose rôle is simply to define what is to be understood by a complex of relations. In regard to what I have called the condition of abstraction (or the principle of indetermination) which appears to frighten Mr. Russell, it is only a way of expressing the fact that in each concept there is a determinate degree of generality, a degree which conditions the indispensable connexion between the concept and the reality of the facts that the concept supposes. This condition of abstraction is the conceptual counterpart of the law abstractly enounced by Stuart Mill under the name of the law of the uniformity of nature. It is needless to stumble over the meaning of this condition. It simply means that in order to be general, every cognition must be somewhat indeterminate, which indetermination does not, as Mr. Russell thinks, reside in the relational elements, those being perfectly determinate, but resides in some of the terms, in the last analysis in some of the things or states of consciousness apart from the concepts. The concrete examples which I have given forbid any mistake in that respect.

I come now to the most important of the observations which Mr. Russell has formulated. At the very beginning of my paper I stated this preliminary question, What is a relation and what is a concept? Mr. Russell objects that it is not sufficient to show that a relation is a composite of other relations more directly known, that such is not a satisfactory answer to the question.

To answer the question there are two points of view at which one can place himself, the logical point of view and that of pure psychology.

The second point of view is that of Mr. Russell. The question is then to ascertain not what is *a* relation but what is relation, what may be that which constitutes

* This would be better named the principle of duality, the word relativity having been put to so many uses that it has finished by losing all precise meaning.

the subjective element, directly apparent, which causes a determinate assemblage of states of consciousness to have a relative character.

This question I have certainly not answered, and I have not answered it because I have nothing to do with it. I took good care from the very beginning of my papers,* even before stating any question whatever, to mark out my range and to reduce it to that of pure logic, merely.

I took as data all cognitions that were established and indisputable, all the principles and all the notions that we study in psychology, all those of the exterior world, those of matter, of time, of space, and even the notion of relation itself. In fine to avoid every encroachment upon psychology I even forbade myself from choosing any of my concrete examples of quantity from geometry or kinematics. I thus placed myself at the logical point of view exclusively, and I hold it for certain that I have satisfied the exigences of that science by showing that the concepts of scientific order are composed of less complex elements which are reducible to differences of the divers states of consciousness, by pointing out the order and the conditions of the derivation of concepts, in a word, by describing all the conditions for the passage from the known to the unknown independently of the question of the primary origin of the known.

There is, it is true, in the theory which I maintain, an important, though voluntary gap, a gap, alas! that certain logicians would find regrettable. I have not studied concepts under their verbal forms of expression, in their relations with language. This is because in accordance with the great philosopher, Mr. Spencer, of whose labors I avail myself, I consider that all questions that relate merely to the ways of expressing thought are foreign to the domain of pure logic. Language, even philosophic language, is an affair of the grammar and the dictionary. The questions as to the distinguishing of all the significations of the copula "is," as to all the forms of the syllogism, as to all the "quantifications" of propositions, belong only indirectly to logic. Besides, this mode of dealing with reasoning, the triumph of scholasticism, has been completely treated by a very great number of authors. They have said all that there is to be said upon the subject, and peevish minds might perhaps add that they have said much more than there was to be said. Our usual language formed by the necessities of life has been adjudged insufficient and symbols have been substituted for it. "Reasoning machines" have even been invented. As for myself, without going so far as to regard as certain that these "improvements" have been rather of a nature to discredit logic than to put it upon a scientific basis, I nevertheless hold that they ought to be excluded from the region of pure logic. I believe that no progress in the laws of the latter can be attained by any combination of symbols however learned they may be, but only by a study perhaps arduous but necessary, of the laws and notions that the sciences offer to us.

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* See especially pages 65 and 66 of No. 151 of the *Revue Philosophique*, also note 2 on page 117 and pages 132 and 133 of No. 155.

Rightly understood, however, I do not dream of excluding from logic, as I regard it, the questions relating to its proper nomenclature. It is plain that it would be useful to unify this, which would be only to avoid divergences of language analogous to those that have arisen between Mr. Russell and myself.

"Relations," observes Mr. Russell, "are attributive predicates of terms." For instance, between father and son Mr. Russell sees two distinct relations, that of the father to the son and that of the son to the father. Conforming myself, I believe to the ordinary language as well as to the language of philosophy, I see only in that case a single relation, and what Mr. Russell calls a simple relation is only the sense in which one regards a relation, or if one pleases the relative place of a term in a relation or in a complex of relations, that is to say that which is ordinarily called an attribute of a term. "Dual relations" are what I call a relation and "relationship," what I call the foundation. Very certainly it would be preferable to have a common terminology, but it is not, however, necessary to infer from the divergence of language as my honorable opponent tends to do, a difference of doctrine.

There is, nevertheless, a matter in which I am not able to follow Mr. Russell in his reflexions upon the theory of relations, because this divergence of language then involves not merely a matter of words, but a matter of ideas. After having chosen as an example of relations, a complex of three determinate terms, that of the donation of a determinate thing, Mr. Russell passes to the consideration of the relation of the mutual attraction between bodies and would there find still three determinate terms comprising besides the two bodies between which the attractions exist a certain "mediating" term which he calls the attraction of gravitation. It is sure that this way of regarding relations has no correspondence with the theory which I maintain and of which the very foundation is the exclusion of every metaphysical entity, an exclusion made by George Berkeley and by David Hume, and for which there exists no reason whatever to return.

IV. MATHEMATICAL EQUALITY.

Mr. Russell is mistaken as to the object of the second part of my paper, which treats of mathematical equality, and his mistake appears to me scarcely explicable when I consider the care I took to multiply the concrete examples.

"There is," says Mr. Russell, "numerical equality upon which the equality in service in numeric algebra is founded, and there is geometric equality, the equality of vectors, etc.," all "different from one another. M. Mouret seems to have numeric equality only, in view." Now, in order to give an exact account of my doctrine, this assertion should be just turned about. Of all the conceivable kinds of equality, the single one that I did not meddle with was precisely numeric equality. The particular equalities which I analysed in detail were the equality of mass, of stress, of temperature, of quantity of heat, etc., independently of all questions of measure, because as I have said and as I am going to repeat, measurement supposes equality. Indeed my paper might better have borne the title "Mathematical Equivalence,"

and if I had recourse to the word "equality" it was only to conform myself to the ordinary language, the word equivalence being reserved for very special cases.

There exists at least in France a numerous class of authors, mostly composed of mathematicians, who consider mathematics as the science of combinations, having for points of departure certain conventions made with numbers, independent of reality in general and of the physical magnitudes in particular.*

It is partly by way of protest against these superficial doctrines, against these philosophical paupers that I have occupied myself in analysing the fundamental notions of mathematics, and my design on this behalf has been to bring into view the truth that under the symbols and notions of mathematics there are notions relatively concrete. If geometry, mechanics, or the physical sciences had not existed there would have been no mathematics possible. As I have said elsewhere, a symbol is such only on condition of symbolising something; otherwise it is nonsense. Numerical equality is only an abstraction symbolised. I had to show that which is concealed underneath the equivalence of masses, of forces, of vectors, etc. This I believe I have done, but I have not preoccupied myself with numerical equality itself. That is a matter I have left entirely aside.

On the subject of the rôle played by equality, numerical or not, in mathematics, Mr. Russell has made a remark, which I must examine, because it tends to nothing less than to suppress the mathematical relativity. I have stated as a principle, that the relation of equality is fundamental and that the very existence of mathematics is bound up in the existence of that relation. Mr. Russell observes that there exists, or that there might exist, a branch of algebraic or numeric analysis having for its sole avail the relation of inequality. He adds that the relation of equality is itself a composite of the two relations "not less than" and "not more than," that is to say, derived from inequality. He concludes that a mathematics can be formed without the use of the relation of equality.

All these assertions are entirely correct, but they do not infringe upon my theory. I said, and I give again my own expressions, "mathematics would not exist, if we "did not have the *notion* of mathematical equality. All the functions (mathematical relations) *involve* this relation." I did not say that every mathematical relation necessarily *comprises* this relation. That would not be exact. What I persist in maintaining is that mathematics essentially supposes equality; in precise terms, that we cannot conceive of any mathematical relation without being constrained, as a preliminary, to conceive relation of equality. The reason which I invoke is the mathematical relativity

My opponent remarks with truth, that the relation of equality may be considered as the negation of two relations of inequality of opposite senses.—this is pre-

* Not all the mathematicians, however, partake of this opinion. Among others Dr. Paul Du Bois-Reymond, in Germany, M. M. Sorel, Couturat, etc., in France. See especially on this subject the excellent remarks of M. Couturat in the first number of the new *Revue de Metaphysique et de Morale*, p. 79.

cisely what I explained with detail in my paper upon "Le sens de l'inégalité,"—but it ought to be added that inequality itself can also be considered as the negation of equality. At bottom, equality and inequality are two correlative notions logically equivalent to one another. It is as easy to dispense with the one as with the other, nor can we think of the one without thinking also of the other. The thought, or rather the cognition, of these two relations is unique, but it has two faces, two contraries, as Hegel said; two contraries that mutually support and determine one another in the same manner and for the same reason that the idea of one half of an apple implies the idea of the other half, even though that other half may be swallowed and digested.

It appears to me, then, not rash at all to maintain that without the notion of equality there would be no mathematics, and this for exactly the same reason that the same would not exist without the notion of inequality.

I must now excuse myself for having been so lengthy, but truly the occasion was a tempting one, for Mr. Russell presented his objections with such clearness and sincerity as to give me solid ground for some, perhaps indispensable, elucidations.

GEORGE MOURET.

BOOK REVIEWS.

OUTLINES OF THE HISTORY OF DOGMA. By *Dr. Adolf Harnack*, Professor of Church History in the University at Berlin. Translated by Edwin Knox Mitchell, M. A., Professor of Græco-Roman and Eastern Church History in Hartford Theological Seminary. New York: Funk & Wagnalls Company, 1893.

This is one of the most important books of the day, inasmuch as it represents the latest results of modern historic criticism in the field of Christian dogma. There was much need for such a book, written from the standpoint of impartial scholarship, to offset the extravagancies of sectarians of every stripe who seek to measure all history by the false plummet of their own partisan interest.

Strange to say, Dr. Harnack's volume exactly reverses the pretensions and merits of most other works on religious history; they profess to be impartial though they are really *ex parte*, while this, the spirit of which is in reality perfectly fair and judicial, is characterised by an obtrusive affectation of partisanship. This phenomenon is to be accounted for by the fact that its author belongs to a faculty of theology the members of which are obliged to promise at the outset to defend and teach the Lutheran religion. As the tenure of office is nominally dependent upon this profession, it is a natural consequence that the free conclusions of a serious and unbiassed *Quellenforschung* should be lavishly decked out with the tinsel chains of orthodox asseveration, as we see in the present case.

The book is not meant to be a history of Christian doctrine in general, but of dogma alone. Dogma is understood in the sense of doctrines formally defined and promulgated by ecclesiastical authority, and its history is supposed to have commenced with the Council of Nicæa and to have closed with the Councils of Trent and the Vatican. In these two Councils "the Catholic Church has abandoned the original motive of dogmatic Christianity, and has placed a wholly new motive in its stead, retaining the mere semblance of the old"; while the evangelical churches "questioned the significance of the empirical church as regards the dogma, and above all they tried to put forward a formulation of the Christian religion which goes directly back to the 'true understanding of the word of God.' Thus in principle the ancient dogmatic conception of Christianity was set aside (p. 4)."

There is a degree of arbitrariness in the entire exclusion of the utterances of the Protestant synods and convocations, which suggests the suspicion that the history of dogma in the churches of the Reformation is excluded because it is too delicate a subject to be handled with safety under the auspices of the state church of Germany.

The History of Dogma now before us casts aside the distinction often made between the special history of dogma and the general history of dogma, or rather aims to be a compendium of both.

The primitive Judeo-Christian religious conceptions centered around the personality of Christ. "The Gospel is the good news of the reign of the Almighty and Holy God, the Father and Judge of the world and of each individual soul" (p. 15). Men are placed under the law of love to God and to one's neighbor, which is to be attained by "self-denial and humility before God and a heartfelt trust in him." The Old Testament was recognised as a primitive revelation, the New Testament books were not yet known, and a strong spiritual monotheism was maintained, there was a "consciousness of a direct and living fellowship with God through the gift of the Spirit," and the end of the world was believed to be near at hand.

In the congregations of the diaspora, and among the Gentile proselytes, this simple faith came in contact with the Græco-Roman philosophies, and especially with the Platonised and Stoicised Mosaism of Philo. Therefore the Gentile Christianity manifested two opposite tendencies from the beginning. Justin, Athenagoras, Minutius Felix, and the other apologists, carried on the Stoic-rationalistic side of the work of Philo, and the Gnostics its Platonic and religious side. The former were the more conservative, having no disposition to investigate the traditions of the Church or to explain their content. "The Gnostics sought in the Gospel a new religion, the apologists by means of the Gospel were confirmed in their religious moral sense" (p. 119).

Irenæus occupied an intermediate conciliatory position, thus becoming the father of the subsequent ecclesiastical Christianity; and his syncretic work was perfected in later generations, especially by Origen, whose system "was intended to be strongly monistic," and by Methodius, who led a reaction against the exaggeration of the Catholic gnosis.

The naïve naturalism of the early Christian communities was superseded by a gradual development of doctrine in correspondence with the contemporary Græco-Roman philosophy of religion; the pneumatic Christology triumphed over the adoption Christology and was succeeded by the Logos Christology.

"The four stages of the development of dogma (Apologists, early Catholic Fathers, Alexandrines, Methodius together with his followers) correspond to the progressive religious and philosophic development of paganism during that time: philosophical theory of morals, idea of salvation (theology and practice of mysteries), Neo-Platonism, and reactionary syncretism" (p. 84). The crystallisation of the scattered Christian communities into a Christian Church began at Rome, and

the local profession of faith of the Roman Church, which had already been formulated prior to the year 140, was imposed upon the whole Church with such authority that it is to this day designated as the Apostles' Creed. But the construction of a scientific theology was the work not of the Romans, but of the Greeks and the Egyptians. The naïvetés and enthusiasms of the primitive Christians, and notably their eschatological interpretations, survived in Rome long after they had been discredited in the Orient. Jewish Christianity ceased at an early period to be a factor in Christian thought, and was represented only by a few obscure outlying sects in the extreme East, whose succession has been preserved in Islam, which is fundamentally a Jewish-Christian system.

The primitive naturalism, as opposed to the supernaturalism and metaphysicism of orthodox theologians, was perpetuated to a certain degree in the Syrian Church. After the deposition of Paul of Samosata, the metropolitan of Antioch, in 268, Lucian and his school still preserved his spirit, Arianism burst forth from his ashes, and even within the limits of Nicene orthodoxy Antioch furnished the most sober and critical theologians and exegetists (e. g., Diodorus of Tarsus, John Chrysostom, and Theodore of Mopsuestia).

In the ultra-philosophic gnosticising theology of Origen and his successors, especially that of Gregory Thaumaturgus, the primitive Christian elements were reduced to a minimum, and a refined polytheism was introduced which threatened to engulf the whole Church; a reaction took place under Peter of Alexandria and Methodius, and the victory of practical religious faith over speculative theology seemed to be sealed by the adoption of the Athanasian formula at the Council of Nicæa, and its final recognition as an œcumenical dogma by the Roman State. Apollinaris of Laodicea and the Cappadocian theologians (Basil, the two Gregories, etc.) however succeeded in saving the Neo-Platonic theology and endeavored to reconcile the religious and theological interests; Rome, with its stubborn monotheism (modalism) and Antioch with its critical rationalism (adoptionist tendencies) being carried along quite unwillingly by the subtle Greek metaphysicians, whose nice distinctions and recondite interpretations they were unable to thoroughly understand or efficiently combat.

The Antiochian adoptionism burst out again in the Nestorian heresy, and in the contest against this the Roman modalism crystallised into Eutychianism, which survived as Monophysitism after its final condemnation at Chalcedon, and lingered on in the form of Monergism and Monotheletism until the eighth century.

The doctrine of the Trinity, which had appeared with Tertullian and Origen, in the form of a successive subordination, i. e., the Son subordinated to the Father and the Holy Spirit to the Son, took final shape in the latter part of the fourth century as a result of the practical exigencies of the Arian controversy. The Holy Spirit had never received any special theological attention; Nicæa left its position still undecided, but when the Arians used the subordination of the Spirit as an argument to prove that of the Son, the orthodox theologians, especially the syncretic

Cappadocian school, with their new Roman jealousy for the unity of the Godhead, and their equal zeal for the integrity of the old Alexandrian speculative orthodoxy, formulated a doctrine which would reconcile the two.

The Logos and the Spirit had been more or less of the nature of Æons, and in the opposition between the world and Deity were sometimes credited to the former rather than the latter. But as the practical interest gained upon the speculative, it was found necessary, in order to avert polytheism and secure the Christian traditions, to throw back these divine emanations into the irrefragable unity of the unique Godhead, a process which was only officially completed in the ninth and tenth centuries, when the Augustinian-Spanish *Filioque* addition to the Cyrillo-Jerusalemic creed (hitherto called the Nicæno-Constantinopolitan), was gradually accepted by the Latin Christians generally, and at last by the Roman Church itself. The so-called Athanasian creed, which grew up in the eighth and ninth centuries, gives it its final theological form, in which the complete unity of the Godhead is perfectly assured. In the Orient, where the *Filioque* and the Athanasian symbol have never won their way, there to this day prevails a tacit subordinationism which veers between a speculative tritheism and the gnostic conception of a trine of adorable Æons emanating from an attributeless, impersonal, actionless deity.

Just as the moral interest had given place to the speculative in the second and third centuries, so the cultic and mystical succeeded to the speculative in the fifth and sixth. Two streams of "mysteriosophy" had come down from the earliest days of the Gentile Church, developing side by side, but in opposite directions, throughout the period of theological construction; the Antiochian, already strongly marked in Ignatius, which attaches itself to the cultus and the hierarchy; and the Alexandrian, which is bound up with spiritual discipline and monkhood. In the first, the layman is viewed as entirely passive; while "the second desires to form virtuosos of religion" (p. 309). To the former, historic Christianity was all-important; the latter tended to dissolve the historic in the symbolic, and the personal and local in the cosmic. The outcome of the speculative theological development, was the recognition of deification as the object of religion and the very essence of redemption. "Instead of a religion of pure reason and severest morality, such as the apologists had once represented Christianity to be, the latter became the religion of the most powerful consecrations, of the most mysterious media, and of a sensuous sanctity." Already in the third and fourth centuries "the tendency toward the intervention of mechanically-atoning consecrations (sacraments) offended even vigorously thinking heathen" (p. 195). In the sixth century the ritual and sacramental elements came to the front as the centres of interest. The end having been already clearly established, it was now the means to the longed-for apotheosis which attracted theological attention; and hence the great development of ritualism accompanied with traditionalism. The pseudo-Dionysius developed the Catholic gnosis and brought together the Egyptian and Syrian mysticisms. John of Damascus summed up and systematised, but already in an artificial and formal way, the old

orthodoxy, and with it the new mystagogy. The Platonic interest, which during the construction epoch had triumphed over the Aristotelian and Old Stoic tendencies of the early theology, now gave place again to the latter, as the traditional and practical spirit came to the front; but Platonism had, since the third century, been so thoroughly welded with Christian doctrine, or, rather, had entered so deeply into the fundamental structure of theology, that it could never again be eliminated until the dogmatic system itself should be wholly disintegrated.

New controversies arose on questions of cultus and discipline; in the image controversy, the Roman bishop, supported by piety and living tradition, as well as the culture, art, and science of the day, triumphed over an iconoclasm which had its mainspring in the imperial politios.

The practical spirit reached its culmination in Augustine, whose extraordinary genius summed up the preceding history of doctine and practice, and nourished the germs of all future developments. He represented the Cappadocian succession, through Ambrose and Victorinus, and was, therefore, Platonising; but the metaphysical interest was in him wholly subordinated to the religious, the cosmic to the personal, and the mystical to the legal.

The Roman jurisprudence had given rise to a strong legalising tendency, which first became apparent in Tertullian, was perpetuated by Minutius, Lactantius, and Cyprian, and now wholly dominated the thought of Augustine, through whose influence it was enabled to subject the orthodox theology, which had lost the brilliant constructiveness and vigorous independence that had characterised the Alexandrian and even the Cappadocian schools. The atonement wrought by the death of Christ the Bible as the law of God, the heinousness of sin, the fearful consequences of the fall, the view of God chiefly as the Supreme Judge, for the first time found a place in theology. He "separated nature and grace," and "discarded the intellectualism and optimism of antiquity" (p. 336). He put guilty man on the one hand, and the living God on the other. Human responsibility threatened to disappear in the emphasis of divine sovereignty.

Augustine was the first great theologian to strongly anthropomorphise God and attribute to Him a personality analogous to our own; the first to consider man chiefly as a sinner; the first to lay prime stress upon an inward experience of forgiveness as an important element in spiritual life. In these particulars, and in the formal recognition of the authority of the Scriptures, he was the forerunner of Evangelical Protestantism; and yet withal he emphasised more than ever before the authority of the visible Church, identified with the kingdom of the Holy Spirit, brought out clearly the doctrine of purgatory, and not only approved the sacramental system, but developed its theology in its relation to sin and grace, and thus became the father of mediæval and modern Catholicism. He had to combat, on the one hand, the pietistic extreme represented by the Donatists, to whom fell the Montanist succession; and on the other, the Antiochian rationalism (Stoic and Aristotelian) which reappeared in the new field of morality under the name of Pe-

lagianism. Augustine, without questioning any of the accepted formulæ, completely transformed theology, and introduced an entirely novel philosophy of religion. The old theology, in spite of its moribund condition, still had vitality enough to throw off some of the Augustinian extremes, and a semi-Pelagianism, in which the coöperation of the human will counted for something in the process of salvation, prevailed under the color of Augustinian phraseology. This modified Augustinianism not only came after a time into almost universal acceptance, but has never since ceased to exert a dominating influence in dogmatic Christianity, Catholic and Protestant.

Pope Gregory the Great (590–604) mingled with it the whole miraculous apparatus of popular Catholicism, and "for nearly half a millennium he dominated without a rival the history of dogma in the Occident." He emphasised the death of Christ even more than did Augustine, and developed the doctrines of the mass, of angel and saint worship, of purgatory and of penance, introducing them securely into Catholic theology.

In the eighth and ninth centuries there was a revival of adoptionism in Spain (Elipandus), and Scotus Erigena developed a mystic pantheism on Dionysian and Augustinian premises; and the contest between the ecclesiastical semi-Pelagianism and pure Augustinianism was still waged among the Franconian theologians. But the general aspect of doctrine and practice remained unchanged until the pietistic movement which took place between the tenth and thirteenth centuries. Under the influence of the "*Ecce Homo*," brought back from the Crusades, "the man Jesus came again to the front, and negative asceticism received a positive form and a new, fixed aim. The chords of Christic-mysticism which Augustine had struck only with uncertainty, grew into a rapturous melody. By the side of the sacramental Christ stepped—penance formed the medium—the image of the historical Christ sublime in his humility, innocent, suffering punishment, life in death" (p. 409). St. Bernard was the great apostle of the new piety, and in him, more than in any preceding theologian love, is the essence of Christianity. "Like Origen, Bernard also taught that it was necessary to rise from the Christ in the flesh to the Christ *κατὰ πνεῦμα*, that the historical is a step. This trait has clung to all mysticism since his time; mysticism has learned from Bernard, whom men reverenced as a prophet and apostle, the Christ-contemplation; but at the same time it has adopted his pantheistic trend. The *excedere et cum Christo esse* means, that in the arms of the Bridegroom the soul ceases to be an individual self. But where the soul is merged in the Divinity, the Divinity is dissolved into the All-in-One" (p. 411).

The Bernardine piety, together with the Roman juristic habit of thought, ruled the mediæval Church and gave rise to its startling contrasts. The scholasticism and mysticism which flourished so prolifically after Bernard's time, both had their root in piety.

The Mediæval revival of science brought about "(1) A deeper insight into the Neo-Platonic-Augustinian principles of theology as a whole; (2) A higher virtuosity

in the art of dialectic analysis and rational demonstration; (3) An increasing occupation with the Church fathers and the ancient philosophers" (p. 418).

Abelard gave the initiative to this advance movement. Bernard and the pietists could not understand him, and opposed him with all their power, and yet his Aristotelianised Neo-Platonism "laid the foundation for the classical expression of mediæval conservative theology" (p. 420). The death of Christ was an act of love to inflame our cold hearts, and Christ's merit was the "fullness of the love of God dwelling in him."

Anselm, on the contrary, developed Augustinianism still further in the direction of modern Protestant soteriology, laying renewed emphasis upon the guilt of sin, the necessity of vicarious atonement, and the "merits" of Christ.

At the beginning of the thirteenth century, "the Bernardine piety of immersing one's self entirely in the sufferings of Christ, was developed by St. Francis, into a piety of the imitation of Christ in '*humilitate, caritate, obedientia*.'" Francis "held before men an inexhaustibly rich and high ideal of Christianity, capable of the most widely different individual phases, and breaking its way through, because first in it did Catholic piety receive its classical expression" (p. 434).

The religious awakening brought about by the mendicant orders was characterised by a special consideration given to the laity, and a popularisation of the most exalted spiritual ideas. It was dominated by mysticism, which "is a conscious, reflecting Catholic piety" (p. 437). It taught that religion is life and love, and urged an "entire immersing in love" (p. 439), whose end was substantial union with God, the "Abysmal Substance," the "Peaceful Passivity," etc.

The Thomistic mysticism taught men to rise to God through knowledge, the Scotistic through the will. The German mysticism, especially, manifested itself as active brotherly love.

Concurrently with the pietistic movement, and parallel to the development of scholasticism and mysticism, there went on a continual consolidation and strengthening of ecclesiastical organisation, and of the power of the Papacy, first developed within dogmatics by St. Thomas Aquinas, but principally indebted to jurisprudence rather than theology. The shocks which it received in the Great Schism of the West had, at the end of the fifteenth century, been largely recovered from.

St. Thomas marked another step in the series of syncretic labors in which stand the great names of Origen, Methodius, Dionysius, the Cappadocians, and St. Augustine. His contribution was the reconciliation of Augustine and Aristotle. Scotism was still more Aristotelian, and through its means causality took the place of immanence in the conception of God and the world. Under the Aristotelian influence, the Roman moralism was reinstated at the expense of Augustinianism, and still holds sway, especially in the Society of Jesus. In the sixteenth century there set in a powerful Augustinian reaction in favor of Plato.

Although St. Thomas completed the separation of God from the world, his conception of Deity still contained pantheistic elements; but the Scotists separated

God sharply from creatures. The Thomists had a modalistic tendency, while the Scotistic school kept the Persons sharply separated, tending to polytheism, or subordinationism. The Thomists insisted upon predestination and necessity; the Scotists upon free-will and arbitrariness.

The doctrine of the sacraments was carried furthest in the physico-magical direction by the opponents of Berengarius and the Bernardine-Franciscan mystics; it was modified by their immediate successors, still further so by the Thomists, and with the Scotists evaporated into a purely arbitrary association of the sacramental rite and the action of divine grace.

The pure Augustinian doctrine of sin and grace was finally set aside by the successive labors of Halesius, Aquinas, and Scotus.

Nominalism represented a wearying of the mind, a despair of rationally proving or justifying the revealed doctrine, and, resolving everything into the arbitrary will of God, which could only be known through revelation, came to the conviction of the irrationality of the revealed doctrine, and "gave out the watchword that one must blindly submit to the authority of the Church" (p. 503).

This favored curialism, whose pretensions were the real aggravation of the Reformation period. Curialism is the system which elevates the Roman Curia to the chief place in religion, looks upon the usages of the Roman Church as having a divine sanction, teaches that the *fides implicita* (blind submission to the authority of the Church) will secure blessedness, and subordinates the dogmatic interest to the religio-political, so as to approve of the ecclesiastical politics which lays first stress upon the maintenance and advancement of the power of the Church rather than the exact interpretation of dogmatic symbols.

The anti-curialism and revived Augustinianism of the sixteenth century worked together to bring about the overthrow of the ecclesiastical system which nominalism had already emptied and undermined.

The outcome of this crisis was three-fold: (1) Tridentine Catholicism, dominated by curialism, but insisting upon a quasi-Augustinianism and having large Franciscan and humanistic elements; (2) Socinianism, critical and Pelagian, representing nominalism and humanism; and (3) Evangelical Protestantism, which in principle set aside the organisation of the Church and its infallible doctrinal traditions and canon of Scripture, in favor of the Augustinian legalistic individualism.

Catholicism has since undergone a further development by the strengthening of curialism, which has reached its culmination in the Vatican Council, and by the casting off of Augustinianism in successive steps represented by the repudiation of the articles of Bajus (1567), the acquittal of the Jesuit Molina (1607), and the condemnation of the Jansenists (1706, 1713).

Socinianism was divided from the outset into three groups. The first was Platonising, allying itself "with the pantheistic mysticism and the new creation of the Renaissance" (p. 530). Among its representatives were Schwenkfeld, V. Weigel, Bruno, and especially Sebastian Franck and Theobald Thamer.

The second was apocalyptic, chiliastic, and anabaptist, opposing to political and sacramental Catholicism "a new social-political world and church system" (p. 531). To this group the separated Minorites and Waldensians belonged.

In the third the humanistic spirit prevailed. Michael Servetus was its typical representative and modern Unitarianism and the *Aufklärungsphilosophie* its progeny.

Protestantism almost immediately returned in practice to Biblicism, sacramentalism, and dogmatism, exaggerating the first, introducing new absurdities into the second, "and making the dogmatico-rational scheme which the Greeks, Augustine, and the scholastics created, for the first time wholly irrational" (p. 561).

"The very man who freed the Gospel of Jesus Christ from ecclesiasticism and moralism strengthened the force of the latter under the forms of the old Catholic theology, yes, he gave to these forms, which for centuries had lain dormant, once again a value and a meaning. He was the restorer of the old dogmas and he gave them back to faith. One must credit it to him that these formulas are even until to-day a living power in the faith of Protestantism, while in the Catholic churches they are a dead weight. Luther turned his contemporaries aside from the path of the humanistic Franciscan and political Christianity and compelled them to interest themselves in that which was most foreign to them—the Gospel and the old theology" (pp. 542–543).

Dr. Harnack saves his own Protestantism by professing his adhesion to "Luther's Christianity," (as distinguished from the theological traditions maintained or resuscitated by Luther,) by which he means "living faith in the living God who has revealed Himself in Jesus Christ and laid bare his heart—nothing else. Objectively it is Jesus Christ, subjectively it is faith; its band, however, is the gracious God, and therefore the forgiveness of sin which includes sonship and blessedness" (p. 546). All the scholasticism, dogmatism, and sacramentalism which Protestantism retains, Dr. Harnack considers a survival of Catholic elements.

Most thinking men will not partake of the Augustinian and "Evangelical" sympathies strongly and openly expressed by him in many places throughout his book; and it is more than questionable whether the Harnack of the closet is in accord with the Harnack of the rostrum.

Augustinian as distinguished from pre-Augustinian Christianity, was a retrogression in so far as it degraded man by its emphasis of guilt and the fall; degraded God by its humanisation of Him; and degraded both by its unconditional predestinarianism, and its substitution of a legal and extrinsic atonement for a process of real interior development.

The independent scientific theology of the Alexandrian school represented the greatest philosophic freedom and the profoundest speculative insight which can be credited to any school of Christian theologians in any period; and it arrived at a system which was morally and metaphysically, if not physically, monistic, as opposed to the naïve dualism of the apologists, the speculative, moral, and physical dualism of the heretical gnostics, and the practical, moral, and metaphysical dualism

of the Augustinians; a system to which we are indebted for whatever is best in Augustine and Aquinas, and which, whatever may have been its errors, was in such fundamental correspondence with the facts of nature and of man that its formulæ are to-day found to be the most suitable embodiment of the religion of science.

If we find the philosophic insight of the Alexandrians too much alloyed with an unacceptable mysticism, it is not to Augustinianism, which dissolves philosophy in a far less noble if less thaumaturgic mysticism, that we should turn, but rather to the sober criticism of the Antiochian school. But the nominalism in which the latter abuts has consequences more fantastic than even the mysteriosophy of Neo-Platonism.

It is to be regretted that so important a work should not have been edited with more care. Not only are there instances of untranslated references, mistranslations, and flagrant Teutonisms, but occasionally proper names and titles of books which have an accepted English form are allowed to remain in one that is wholly strange to the English reader. Another defect is the absence of an index or of chronological notes. As the arrangement of the matter is necessarily far from being chronological it is not easy to find passages sought for. But in spite of these superficial imperfections, the scholarly portion of the American public cannot be too grateful to Professor Mitchell for placing before it this invaluable and almost epoch-making work.

MERWIN-MARIE SNELL.

DARWIN AND HEGEL. With Other Philosophical Studies. By *David G. Ritchie*, M. A. London: Swan Sonnenschein & Co. New York: Macmillan & Co. 1893.

The reader of the philosophical periodicals is already well acquainted with the essays of Mr. Ritchie here collected. Nine in number, they appeared in *Mind*, *The Proceedings of the Aristotelian Society*, *The Philosophical Review*, etc. Their titles are: "Origin and Validity"; "Darwin and Hegel"; "What is Reality?"; "On Plato's Phædo"; "What are Economic Laws?"; "Locke's Theory of Property"; "Contributions to the History of the Social Contract Theory"; "On the Conception of Sovereignty"; and "The Rights of Minorities." Though apparently isolated discussions of philosophical and other topics, selected at random, they are yet presented under a common point of view and form a coherent set of illustrations of Mr. Ritchie's philosophy, which subsequently, perhaps, will be more fully developed. The title of the book is that of the second essay, "Darwin and Hegel"; because this antithesis best emphasises Mr. Ritchie's point of view—an attempted reconciliation of the idealist principles of Hegel, as based on Kantian criticism, and the evolutionary theory of Darwin, as it is now generally expressed in the so-called "historical" method of studying ideas and institutions. This point of view is well sketched in the opening essay "Origin and Validity," where Mr. Ritchie analyses the contents of knowledge, places the true emphasis on the Kantian doctrine of the *a priori*, defines the limits of metaphysics, and shows us the important difference

which exists between an historical and a philosophical analysis of ideas and institutions.

This last distinction is the key-note of the book. We have not solved the problem of a thing or an idea when we have shown how it has come about (i. e., disclosed its origin, its material cause, Aristotle's ἐξ οὗ). There still remains the important task of critically studying and testing its validity, its function, aim, or purpose (τέλος), the complete state *as it now exists*, which is the task of philosophy or of metaphysics (in its good sense). Metaphysics, or the study of the conditions which make knowledge, conduct, and nature possible, cannot be dispensed with. The recognition of this is Kant's immortal merit. Without the so-called *a priori* elements of cognition, science is impossible; and what is called *a priori* in the theory of knowledge has its formal correspondents in the "ideals" of logic, ethics, and æsthetics. In the theory of knowledge, the elements which are not dependent upon sense-experience for their validity are usually termed "categories," and are such as "identity," "cause," "time," "space," and so forth. These notions are not intuitive, not innate, not mystical; they are not without a psychological history; neither are they limited in number; but—and this is the point of importance—without them, knowledge, conduct, nature, are impossible, and *this is what is meant by a priori*.

Philosophies all now tend to recognise this distinction of the *a priori*, properly understood, from the sensational element. Only within this domain, when once established, as an instance from Mr. Ritchie's own realm of ideas well illustrates, there is much room for differences that wholly outweigh the agreements of the individual philosophies in the acceptance of the distinction. Take, for instance, Mr. Ritchie's category of "self-consciousness." Following Professor Green Mr. Ritchie says, that to make knowledge possible there must be "a comparing and distinguishing Self." It matters not that this Self has a psychological history; to render it *a priori* it is sufficient that it is a *necessary presupposition* of knowledge. But since time "though relatively a form, may also be a content of knowledge, this self must be independent of time; I know I am a series of experiences in time, therefore in some way I am not in time—but an eternal (that is, timeless) self-consciousness." Further, "that there is an eternal self-consciousness we are logically compelled to believe, and that it is in *some way* present in our individual selves; but in *what way* is a matter of speculation." Again, "and it is still quite competent, to any one who accepts the main result of the critical examination of knowledge, to maintain that this latter problem is altogether insoluble; although it is a problem which we cannot leave alone because we are met by it at every step in our ordinary experience."

Call time, space, substance, cause, what we will, all must agree that these notions or categories are abstractions of fundamental features of existence; they express the connexions, the interdependences of existence. If a thing exists, it must partake of the nature of existence. It must be in some way connected with the universe or with reality, so that it can affect it; and it can only affect it through the means, connexions, or activities which we have formulated as time, space, cause,

motion, and so forth. Consequently, anything which is beyond, above, without, or independent of, the criteria of existence, cannot exist; as must certainly be the case with Mr. Ritchie's idea of Self, if it is independent of everything. To say that "Self" is a presupposition of knowledge is no more true than to say that the *world* is a presupposition of knowledge, and that (by the same process of reasoning) this also is independent of time, etc., etc., that is, of itself. But this may not be the Idealist's view. At any rate the psychological analysis of the soul can teach us one thing: that the notion of Self is a very complex notion, and that if we place it on the same level with "cause," "time," and so forth, we shall be able to derive from it whatever we want. The idea, as a "category," seems to be an anthropomorphic expression for the psychical aspect of the universe, which if it is, could be stated in a much simpler way than the followers of Professor Green state it.

In Mr. Ritchie's hands, however, the idea of "Self" serves a good purpose. It bridges over the chasm between elemental feelings (*origin*) and the present, developed state of human self-consciousness, which now exhibits itself as a fact whose *validity* must be analysed. It is only from the latter, elevated point of view that knowledge is possible, and that the universe can be judged; that is, from the point of view of the thing as it is or can be, not as it was. Thus, also, are we led to ethics and its related sciences. For this eternal, independent Self, as it is never completely realised in any one of us, always remains the ideal which perpetually urges us onward.

These distinctions of the formal and historical character of ideas and institutions are well worked out in the succeeding essays, as practically applied to the notions of the state and society. In conformity with the fundamental distinction of his work, Mr. Ritchie calls his philosophy "idealist evolutionism."

The essays are written in excellent style, and though they are more like chats on philosophical subjects, which make us cherish the hope of a subsequent, more systematic treatment, they yet constitute a real and interesting elucidation of the theory of idealistic monism. Mr. Ritchie need have no fear about the "infliction" of his "big treatise" on the public. μκρκ.

DIE TROJABURGEN NORDEUROPA'S. Ihr Zusammenhang mit der indogermanischen Trojasage von der entführten und gefangenen Sonnenfrau (Syrith, Brunhild, Ariadne, Helena), den Trojaspielen, Schwert- und Labyrinthtänzen. Zur Feier ihrer Lenzbefreiung. Nebst einem Vorwort über den deutschen Gelehrtendünkel. By *Dr. Ernst Krause* (*Carus Sterne*). Glogau: Carl Flemming. 1893. Pp. 300.

In *The Monist* for July, 1891, a review appeared of the predecessor of this work, which was entitled *Tuiskoland*. In this book Dr. Krause sought to prove that the legend of Troy originated in an old Indo-Germanic race-saga, which was best and most faithfully preserved in its northern forms, and not in its perverted but more famous classical versions. The theories of the author met with much opposi-

tion in linguistic and classical circles, and Dr. Krause felt it incumbent on him to present a supplementary defence, or rather corroboration, of his position. The result is the present series of researches on a class of prehistorical names and myths hitherto much neglected—the Troy-towns and labyrinths, Troy-games, and sword and labyrinth dances (e. g. Morris dances) of the Indo-Germanic races.

Dr. Krause writes eminently readable books; his style is always pleasant and his conclusions carefully put. He unites with industry great ingeniousness, and possessing an extraordinary command of the literature and history of his subjects, is wonderfully successful in the accumulating and digesting of pertinent material. We could only wish that in the great mass of matter which he thus marshals there were more methodical arrangement, that the reader might see at once the point at which he aims, and enjoy the full advantage of the wealth of argument which he adduces. The book is, according to the tradition of German book-making, not indexed; in the contents only the titles of the chapters are mentioned, and the sole clue to the subjects discussed is the analytical headings at the tops of the pages. But these defects are in some measure compensated for by a rare picturesqueness and gracefulness of diction, the charm of which no one can escape, and which will sustain all in their progress through this wonderful labyrinth of facts. It remains to be said that there is much delightful polemic in this book, which will be manna to scholars who, like Dr. Krause, have felt the stings of academic contumely.

But now to the work. And, first, to the facts which have suggested Dr. Krause's explanation.

* * *

It frequently happens in history that one eminent name gathers to itself all the great and characteristic features of its age. And this is true not only of persons, but also of places. Venetians are found in many parts of the ancient world, but Venice alone is the historical heir of the name. The same is true of Rome; but more especially is it true of Troy. Nearly all the European nations claim to be descendants of the Trojans; as the name of a place it is universal in Europe, and innumerable are the legends connected with it.

But in addition to the prevalency of the name as the designation of a city another fact is remarkable. "Troy-town," (Scandinavian, *Trojian, Trojeborg, Trojenborg, Tröborg;* Welsh, *Caer Droida*) is a term employed since time immemorial in northern Europe to designate certain curious labyrinths of paths, formed by circular rows of stones, or labyrinths of circular furrows cut in grassy places. These Troytowns are found, designated by this name, in England, Denmark, Sweden, Norway, and Finland, the most famous being the stone Troytown at Wisby in Gothland, which is about eighteen metres in diameter. They are found in great numbers in the coast-lands of Russia, where, for reasons which will hereafter appear, they are called Babylons. Symbols of them, in the shape of concentric circles, are sculptured on the sand-stone rocks of parts of England, and are referred to in the Druid Songs. And on the coins of Knossos, of Crete, and of other Mediterranean

nations, labyrinthine mazes, strongly resembling the Troytown of Wisby, are engraved. Quite independently, also, similar tracings are found in the books and manuscripts of the mediæval Northern Christian nations; while the outlines of these Troytown labyrinths form the patterns of the mosaic floors of many mediæval cathedrals.

With all these labyrinthine structures, plans, and tracings, or Troytowns, certain ceremonial or festal practices, especially dances, performed or celebrated in the spring, are connected; and with these ceremonies are associated certain legends and myths, which have a common basis.

Let us first consider the etymology of the word "Troy." According to Dr. Krause the term is unquestionably of Germanic origin. In Swedish, *Troy*, or *Traeggia*, denotes a stronghold; *trygger*, secure and proof against attack; *Trojin* and *Trojenborg*, a strongly fortified citadel; *Troija* and *harnisk troja*, an iron breastplate; and *tröja* a kind of jerkin. Also in Old German and Danish this second meaning is common: here various forms of *true* and *Troy* denote doublets. And, finally, in Old German forms a third meaning, that of dancing, is found. These three meanings are all probably derived from a common root denoting to circumvallate, to enclose, to circle about—the root *tro*, *troi*, *tru*; a conclusion which is suggested by the shape and use of the Troytowns. But they may also all be derived from some old word, still preserved in the Sanskrit *dhruwa*, denoting what is secure, reliable, and durable. In collateral meanings, they approach the sense of "to exorcise," "to bewitch."

The sagas which are connected with these labyrinths and their associate customs, all refer, in some way, to the liberation of a maiden of divine birth from the Troytown or labyrinth. The maiden is the sun-goddess; the labyrinth is the winter; the liberation, the reappearance of the sun in the springtime after its long captivity. This, it will be seen, is a distinctively Northern idea.

The best known of the Northern legends embodying this fact is the story of the Smithking of the older, or prose, Edda. The Smithking goes to the Ases and promises to build for them a strong castle in which they will be protected against all attacks if they will give him as his reward the goddess Freyja, with the sun and moon. The Ases accept the offer, but make the condition that the Smith shall build the castle in a single winter, while if he fail but by one day he shall be deprived of his reward. By a deceitful strategy, on the last winter day, the Ases render it impossible for the Smith to complete his work. The Smith falls into a tremendous rage, is recognised by this exhibition of anger as one of the giants of the mountain, and is slain forthwith by his hereditary enemy, the god Thor, who, it happens, has been long away, but is sent for by the Ases.

In the corresponding legends of India it is also a builder or smith who keeps imprisoned the maiden; he, too, is the constructor of the stronghold, palace, or labyrinthine trap in which the sun-goddess is kept. Thus, in the Indian tale Ramayana, Varuna, or rather Tvaschtar (who is none other than Varuna himself) builds

a large, strongly fortified palace with hundreds of rooms, for the imprisonment of the sun-goddess Surya.

In Southern Europe Dædalus builds the Cretan labyrinth; Hephæstus that on the island Lemnos; and Valand or Völdr that in the North. With the Icelandic saga of Wieland, or Valand, the labyrinths, which were there called Wieland's houses, are distinctly associated. In this saga, to win a princess's hand, a wild animal is caught in a trap (the labyrinth) by Egeas. But Egeas is identical both with Wieland, or Valand, and with the Greek Aegeus, (father of Theseus, the rescuer of Ariadne from the Cretan labyrinth,) who was also called Phalantos (=Valand).

If we observe the sun, as after the longest day in the year it begins daily to describe a deeper arc in the heavens, its path will appear to us as a labyrinthine line that ever leads it nearer to the prison in which in the far North it is hidden for several months. The giant Evening Red, or Tjugari, now holds her* in his nets; and in the spring she is again let out of the labyrinth by the same winding paths. But as the moon and the other stars describe similar paths, the idea easily suggests itself that the entire world-structure is such a labyrinth built by a crafty smith or master builder, who can trap at will the sun in his mazes, and may possess her when he will, leaving the world in wintry sleep. Plainly such a conception could only have had its origin in the North.

From the names which the Smithking, or builder, has, in the different forms of the Northern saga (for example, *Vind* and *Vedr*), it is conclusive that the builder or smith is a personification of winter, and that we are confronted in these tales with a myth of the seasons. Thor is the god of summer. He slays the winter-giant, or smith, and wrests from him his prize, Freyja; and the rescue is celebrated in all Northern Europe, as it was in the South, by games and practices in which this idea was, more or less, the central motive. The smith-story, in fact, is actually identical with the old Roman festival of Mamurius Veturius—"the old smith"—although the basis of the practice was here forgotten. The Grecian story of the building of the walls of Troy by Poseidon and the cheating of the latter of his promised reward, Hesione, the daughter of the king, is also a blundering reproduction of the old Aryan northern saga.

In the legend of Siegfried and Brunhilde, and in its offshoot, Dornröschen, we also have a season myth. But this myth is not so distinct as the legend of Iduna and Thiassi, in which we have a complete parallel of the Freyja saga. Saxo Grammaticus tells a Danish story of a virtuous and wonderfully beautiful princess Syrith, whose father had promised her to whomsoever she should condescend to bestow a glance upon. She was abducted by a giant who took her to the mountains, where afterwards Othar rescued her, on whom she "condescended to look." Here Othar is Odhr, and Syrith is Freyja or Syr. From the variant forms of this myth which

* The old Aryans, unlike the classical nations, did not conceive the sun as a male deity and the moon as a female one, but *vice versa*.

at times approach the Dornröschen and Brunhilde legends, it appears that we must replace the old interpretation of these legends, in which the sun-god kisses and awakens Nature, by a new one, in which the summer-god kisses or liberates the sun. Thus Dornröschen is the sun not Nature, and Thor the summer-god, not sun-god, who liberates her in the spring from the power of the winter-giant or winter-builder. Etymologically, also, Syr, or Syrith, is connected with the Indo-Germanic names for the sun.

Continuing, Dr. Krause shows that many of these myths are found in even a simpler form than the Teutonic in the Slavic and Lithuanian races, these being much nearer the simpler stage of national childhood than their more civilised brothers. This is essentially the case with the legend of the maiden that is stolen and put in a tower by a grim old man, and afterwards freed by a youth with a magic horse that flies unhindered over mountains and seas. In most of these cases the youth slays the dragon, and is carried by his horse over nine winding walls. These winding walls are significant. They are connected with the nine winding walls of the legendary tales of Babylon (whence the Russian name), and with the spiral furrows of the worm-hill of the English story of the Worm of Lambton, which were supposed to have been made by the coils of the dragon, as he lay about his charge. In all these stories of the abduction and liberation of the sun-maiden there is either a stronghold or a dragon, and, as we see, in both there is the idea of the labyrinth or trap,

Coming to the classical South, we also have, in the Medea and Ariadne legends, princesses with heroes who slay dragons and monsters. In both cases we also undoubtedly have a season myth, though in less primitive a form. Always, the sun-goddesses are left by the sun-heroes. Jason forsakes Medea, Theseus forsakes Ariadne, as Siegfried did Brunhilde, and Othar, Syrith. The reason of this is evident. The sun must belong alternately to the summer and the winter. Each conqueror can keep the goddess but for a while. Each in turn must surrender her to another: Jason to Eageas, Theseus to Dionysos, and Siegfried to King Gunther. This is also the significance of the myth of Perseus and Andromeda.

* * *

The deliverance of the sun-goddess from the power of the winter-god was celebrated among all Indo-Germanic nations by dances and games, such as the Easter games. Now, all these games partake of a martial character; they are indicative of struggle. And the scenes of these games are the worm-hills, the Troy-towns, the labyrinths, the miniature, many-walled strongholds.

Tacitus speaks of the weapon-dances of the Germanic nations. In fact, there are many records of the sword-dances of the old Germans, survivals of which exist to-day. All symbolise the expulsion of winter by force, and the greeting of spring. In the English morris-dances Robin Hood rescues Maid Marian from the power of the demon of winter. In some of the English May-games, even the dragon and his conqueror appear (Snap-dragon).

But most interesting is the history of the Troy-games and Salian dances of ancient Rome. Virgil, under the influence of the Cæsars, makes Æneas, the mythical forefather of the imperial rulers, the founder of the Troy games. Æneas is said to have founded a temple to his mother, Venus, in Latium, where the *Castra Trojana* were located, and to have dedicated these games to her. Venus here bore the name of Frutis, which, with Olaf Rudbeck, Dr. Krause connects with Fru Disa or Freyja. This Troy game, *ludus vel ludicrum trojæ*, which the Julian tribe supported in remembrance of their noble origin, was found to be an exact counterpart, almost, of an ancient religious dance, labyrinthine in character, of the original inhabitants of the land, which had degenerated into a child's game, but bore the same name as the other. Subsequently, research revealed that the Troy games were only artificially connected with the story of the Homeric Troy; that the name and game were Old-Italian and could be traced back to the weapon-dances of the Salian priests held as a greeting of spring. This dance was a labyrinthine dance. But more remarkable still is the fact that the Salii were smith-priests, or priests of a smith or builder religion, which only afterwards became the cult of Zeus and Apollo. Moreover, in the Latin words expressive of the movements of the dance, namely, in *antroare* and *redantruare*, the root *tro* is found, which is also the root of the northern words, and signifies to turn, or turn about. The conclusion is thus plain, that this Troy dance, or dance Troa, was a labyrinthine dance, danced, since time immemorial, by all nations from the shores of the northern oceans to those of the Mediterranean Sea, in celebration of the deliverance of the sun-goddess from the labyrinth of the winter-god.

The whole myth has its plainest form, not in Troy, but in Crete, whose inhabitants unquestionably migrated from the North. The labyrinthine dance of Crete was admittedly in honor of the sun. Ariadne, the imprisoned maiden of the Cretan labyrinth, is the *shining goddess*. Of the origin of the Cretan dance which was called Geranos, or the dance of the storks, there are many variations. According to Plutarch, the dance originated with Theseus and is connected with the cult of Venus, as was the Troy dance of the Romans. Theseus is said to have forsaken Ariadne on Naxos, which agrees with the separations of Othar and Syrith, Siegfried and Brunhilde, Jason and Medea. According to other stories, Athene appears as a mediatrix and persuades Theseus to give up Ariadne again to Dionysos. Here again is the conflict of summer and winter for the goddess of the sun. As a matter of fact, Athene was herself originally Ariadne, the sun-maiden to be liberated, and she appears on all statues as the protectress of Theseus whilst he slays the Minotaur, who is none other than Dionysos. According to old versions, also, Athene is said to have first instituted the weapon-dances. She was also the goddess of horses *(A. Hippia)* and well corresponds with Frutis or Venus Equestrius, to whom Æneas or Ascanias is said to have dedicated the Troy game. But Ariadne stepped into her place, and the labyrinthine dance was accredited to her.

Again, according to the still older version of Homer, this dance, as it was por-

trayed on Achilles's shield, was invented by Dadælus, the constructor of the labyrinth. Besides, this version is in fuller accord with the Germanic and Icelandic saga, according to which the labyrinths are called Wieland's houses. As a matter of fact, the agreement in point of detail of the German Wieland and Wittich sagas with the Grecian Dadælus and Theseus legends is startling.

But it is the belief of historians that the labyrinth, as such, never existed, but was originally a labyrinthine dancing-plat, where dances were performed in celebration of the events on which the myth was founded, the myth afterwards assuming its historical form. Evidence of this is the fact that the coins of Knossos in Crete bear the impression of a Troytown that is almost an exact reproduction of the Scandinavian Troytowns, which were notably dancing-plats. Again, the legends of the island Delos, on which Theseus is first said to have performed the Geranos-dance, are associated with legends that almost exactly correspond with the legends of Gothland. But the features of the Delos legends have a foreign and strange coloring, while the sagas of Gothland are natural and consistent. In Gothland there still exist four stone labyrinths called Troytowns, in which labyrinthine dances were very probably performed in honor of the springtime return of the summer-god of thunder, and of the liberation of the sun-goddess. Whether such stone labyrinths existed in Delos is not known, although it is possible that the *tropai Helioio* of Homer were such.

Subsequently, as with other religious ceremonies, not excepting even the Christian sacraments, these dances were transformed into species of magic conjurations for the control of the weather, a fact which explains the appearance of the labyrinthine Troytowns on island coasts which were uninhabited; the theory being that they were erected here by becalmed sailors, for conjuration of the weather.

* * *

The classical legend of Troy has two forms. The oldest is that of the pledging of Hesione to the builder of the stronghold and her deliverance from the power of a monster by Heracles. This agrees with the Edda myth of the pledging and deliverance of Freyja from the Smithking. But even in its late Homeric form, of the captivity of Helen in Troy, the same features are discernible; Helen's very name betraying her as the sun-goddess, from Helios, the sun. In the Iliad form, the true features of the Northern legend are lost; even the Bulgarian St. George's myth has better preserved the ancient features. It is also assumable that the very name of Troy in Homer is derived from the ancient Aryan saga; for Troy, as such, probably never existed; the town which is now believed to be its site having probably been afterwards connected with the myth. In its first permanent form among the Ionians and Greeks there were three accounts of the maiden liberated from the Troytown (Athene, Hesione, and Helen); but there is nothing here of a castle, or a labyrinth, or of a ceremonial labyrinthine dance. The Romans, on the other hand, did have a labyrinthine Trojan dance; but here the liberation of the maiden was forgotten, and the stone labyrinth does not appear. In the Cretan labyrinthine

dance the ideas of the liberation of the maiden and of the stone labyrinth are united, although the name Troy is wanting. The same disconnectedness is found in the Hindu and Persian versions. Only in the North is the key of this broken web of fiction to be found. For, fragmentary as the Northern traditions are, their connexion is plain, and their explanation evident. All point, indubitably, to a single basic spring-myth, which we now all know, and which has meaning only as applied to Northern conditions.* THOMAS J. MCCORMACK.

THE ETHICS OF HEGEL. Translated Selections from His "Rechtsphilosophie." With an Introduction by *J. Machride Sterrett, D. D.* Boston: Ginn & Co. 1893. Pp., 216. Price, $1.00.

The Ethical Series of the Messrs. Ginn & Company of Boston, (Prof. E. Hershey Sneath, editor,) is projected as an improved means of undergraduate instruction and study in ethics, the idea of which is to substitute for lectures and books about ethical systems, those systems themselves, or, at least, representative parts of them, in the original words of the authors. The first volume of this series, "The Ethics of Hume," (reviewed in *The Open Court* of April last, No. 295,) was edited by Dr. J. H. Hyslop. The present, the second, volume, on Hegel, is edited by Dr. J. M. Sterrett, well known in this department of philosophical literature as the author of "Studies in Hegel's Philosophy of Religion." The great Hegelian erudition, displayed in that work, must have stood Dr. Sterrett in good stead in the preparation of the present volume, for the latter task, necessitating, as it did, the translation into English of a number of pages of one of the most profound and technical of the German philosophers, was undoubtedly a very difficult one. Consequently, there is much necessary "introduction" and "exposition" in the book. There is a bibliography of the ethical works of Hegel and of treatises in the spirit of Hegel; a biographical sketch and exposition of his philosophy; a few pages on Hegel's German terminology; and an abstract of Hegel's Introduction. The selections translated are chiefly from the *Rechtsphilosophie*, although there are some supplementary extracts from the *Phänomenologie des Geistes*, the *Philosophie des Geistes*, and the *Philosophy of History*. It only remains to be added that Dr. Sterrett's translation of the passages selected is very literal; in fact, as he himself expresses it, "too literal for intelligibility, unless accompanied with careful study." The idea of this series is very good. μκρκ.

ENTARTUNG. Vol. II. By *Max Nordau*. Berlin: C. Duncker.

The first volume of this interesting work was discussed in our *Monist* correspondence for July, 1893. Simultaneously with the appearance of the second edi-

*Just recently Dr. Krause has published, in the form of a supplement to this work, a pamphlet of forty-eight pages, entitled *Die nordische Herkunft der Trojasage, bezeugt durch den Krug von Tragliatella*. (Same publisher.) This pamphlet possesses the advantage of being a short résumé of the larger work and may be profitably read by readers who have not the requisite time to spare for a perusal of the *Trojaburgen* itself.

tion of the first volume and with various translations of it into foreign languages the second volume appears. By far the largest part of this volume is concerned with the pathology of egotism, or *Ichsucht*, the nature of which is psychologically analysed and copiously illustrated by examples from modern literature. The author's point of view which is found in the main chapter of the work, "The Psychology of Egotism," is somewhat as follows:

Consciousness is a fundamental property of living matter. The highest organisms are colonies only of very simple organisms (cells), which, by complex differentiations, bring it about that the colony as a whole can perform higher functions than the cells individually can. The compound or ego-consciousness of the colony is made up of the individual consciousnesses of the parts. The ego-consciousness is composed of an obscure, neglected portion which superintends the vital activities of the cells, the cœnæsthesia, and a luminous, preferred portion which observes and watches the work of the sensor nerves and the voluntary muscular life. This luminous consciousness makes the discovery that acts of will precede voluntary motions: it arrives at the assumption of causality. It remarks that the incitations of the senses do not have a cause inherent in itself. It is constrained, therefore, to displace the cause whose assumption it cannot dispense with, to some other place, and is thus necessarily first led to the conception of the non-ego and then to the development of this non-ego into the general phenomenon of the world. In men of normal nervous constitutions, in this development, the ego falls back of the non-ego, and pictures of the outer world occupy the greatest part of consciousness. In degenerate or abnormal persons, on the contrary, the sensor nerves are imperfect conductors and the centres of perception in the brain are heavy and obtuse; these, with weakness of will and the incapacity thus conditioned of attention, added to nervous, irregular, and violent physiological processes in the cells, are the organic foundations on which *Ichsucht* or egotism rises.

As the result of organic defects, the egotist does not know, does not comprehend, the world-phenomenon. The consequence is, lack of interest and sympathy and an incapacity to adapt himself to nature and humanity. Lack of feeling and incapacity of adaptation, frequently accompanied by aberrations of the natural instincts and by fixed ideas, make the egotist a foe of society. He is a moral lunatic, a criminal, a pessimist. an anarchist, a hater of humanity, either in his thought and emotions, or in his deeds. The battle against the misanthropic egotist, his elimination from the body of society, is a necessary function of the social organisation, and if society is incapable of accomplishing its duty in this respect, it is a sign of decreasing vital power or of a diseased condition. Toleration, or what is worse, admiration, of the theorising or acting egotist, indicates that the kidneys of the social organism are not performing their functions, that society itself is afflicted with a kind of social Bright's disease. (Pp. 1–42.)

Nordau is most successful in his psychiatrical analysis of the French Parnassians and Diabolists (pp. 43–86), the Decadents and Æstheticists (pp. 87–152); less

successful is he in his treatment of the poet and the philosopher of egotism, Ibsen and Frederick Nietzsche (pp. 153–357), although even here his criticisms are worthy of attention. Owing to the extent of his discussions, it is impossible to give in a brief space anything like an exact idea of the results of Nordau's analysis. But a few words with regard to Ibsen will indicate his chief conclusions.

According to Nordau, Ibsen is not a full-fledged specimen of psychosis, but only an inhabitant of the border-lands, a *mattoid*, who as a poet possesses no other genius than the technical virtuosity of fitting his productions to the stage. In addition to the stigmata of egotism are also to be found in this man, marks of a pathological mysticism; but upon the whole he must be classed among the egotists and not among the mysticists.

In the first place, owing to his defective nervous constitution, Ibsen has only very imperfectly comprehended the external world, and deserves, therefore, by no means the title of realist. Nor can anything like a scientific foundation for his dramas be admitted, although superficial critics have asserted such. Furthermore, the material which he derives from the outer order of things is not properly digested; he is wanting in clearness concerning his own feelings and thought, and lacks correct judgments of the external world. Comparison of his various works discloses a striking poverty of thought. The flow of his thoughts often halts, and in such extremities obscure, apparently profound, but in reality nonsensical circumlocutions are resorted to. The religious impressions of his youth are retained, but are not harmonised with his new sphere of thought. Although he puts himself up as a free-thinker, three religious notions constantly enter his thoughts and act like fixed ideas: heredity, sin, confession, and self-sacrifice or redemption. He is also often guilty of a nonsensical symbolism. As he has not correctly comprehended and judged the world, but is a strongly emotional and impulsive nature, he is in a constant state of revolt against everything that exists. He does not undertake any rational criticism of the existing order of things; he does not show, for instance, what is bad or what might be made better: no, he simply casts upon it the one reproach that it exists. He is a theorising anarchist whose teachings teem with self-contradictions—"a malignant, misanthropic *Faselhans*."

C. U.

ERNST PLATNER UND KANT'S KRITIK DER REINEN VERNUNFT, MIT BESONDERER BERÜCKSICHTIGUNG VON TETENS UND AENESIDEMUS. By *Dr. Arthur Wreschner*. Leipsic: C. E. M. Pfeffer. 1893. Price, 2 M., 50 Pf.

In 1889 the philosophical faculty of the University of Berlin proposed the question of Ernst Platner's scientific relation to Kant as the subject for a prize dissertation. The present treatise of Dr. Wreschner was one of those which this offer called forth. It includes also a special consideration of Tetens and Aenesidemus. Platner, says Dr. Wreschner, was not an original thinker, and, by his own confession, made no pretension to originality. He is rather to be regarded as an eclectic, something after the style of Leibnitz. He brought together from all quarters what

he deemed best and most serviceable for the construction of an independent system. Only in his case Leibnitz's genius was lacking. Of the three dominant schools at Platner's time—the rationalistic, the empirical, and sceptical—Leibnitz and Kant were the representatives of the first, Gottlob Ernst Schulze (Aenesidemus) of the third, and Tetens of the second. After that of Leibnitz and Kant, Tetens's influence on Platner is greatest. A consideration of the philosophies of all these men, therefore, is incorporated by Dr. Wreschner in his book.

Platner being admittedly an unoriginal thinker, and one who has not contributed any prominent feature to the physiognomy of the world's thought, it might be remarked that learned and laborious discussions of his relations to contemporary philosophers are a waste of time and mental energy. But this is not Dr. Wreschner's opinion. According to him, it is only by a study of the average minds of an age that its true character and tendencies can be determined; in fact, without this help, even its foremost minds cannot be justly estimated. *μκρκ.*

PHILOSOPHY AND POLITICAL ECONOMY IN SOME OF THEIR HISTORICAL RELATIONS. By *James Bonar, M. A., LL. D.* London: Swan Sonnenschein & Co. New York: Macmillan & Co. 1893.

The work of the Library of Philosophy is rapidly pushing forward. Besides Erdmann's general work on the "History of Philosophy" three other historical treatises have now been published, dealing respectively with ethics, theology, and (the present work) economics. A long list is marked as "in preparation," among them, on this subject, being "The History of Political Philosophy," by Mr. D. G. Ritchie, whose work, "Darwin and Hegel," is reviewed in this *Monist*.

Dr. Bonar's work, a contribution to the second series of the library, or the department which treats of the history of particular theories, is a portly, well-indexed volume of four hundred and ten pages, the publishers' work of which is excellent, and which the author has much increased in value by adding an introduction, a summary, and a good table of contents. Dr. Bonar's work in the proportions in which it is here undertaken, is a new and unattempted one, only monographs, limited to special periods, having hitherto been written on this subject. The idea of the book—that of tracing the connexions of economical and philosophical ideas throughout the whole of their history—was suggested to Dr. Bonar by a remark of Prof. Adolph Wagner of Berlin.

The author first takes up Ancient Philosophy, and deals with Plato, Aristotle, the Stoics and Epicureans, and Christianity, treating of the idea of wealth, production and distribution, and civil society in these systems. The characteristic of Ancient Philosophy in this respect is that the ancient philosophers treated more fully of economical topics than modern philosophers do, the reason being that the two disciplines, philosophy and economics, were originally not separated. But although subsequently direct economic discussion occupies a proportionately smaller space in philosophical works, on the other hand the consideration of the philosophical roots

of economical ideas is much more thoroughly treated. This is the characteristic of the later period. With Book II, on Natural Law, the discussions of modern philosophy begin. Here Machiavelli, More, Bodin, Grotius, Hobbes, Harrington, Locke, Hume, the Physiocrats, and Adam Smith are treated. In Book III the doctrines of Malthus, Bentham, the two Mills (the Utilitarian Economists); in Book IV, those of Kant, Fichte, Krause, Hegel (the Idealistic Economists); in Book V, those of Karl Marx, Engels, Lassalle (the Materialistic Economists), and the Evolutionists, are discussed. In modern times, we find, political economy grows out of political philosophy. The mercantile theory was essentially political; so were Hobbes's and Locke's theories of property. Even afterwards, when economical subjects were ethically discussed by Mandeville, Hutcheson, and Hume, the systems of Smith and the French economists were the outgrowth of political considerations. The philosophical, or rather metaphysical, notion of natural law, and its later offspring, the rights of man, persists even in the economical works of to-day. Finally, in modern socialism, philosophical and economical problems, before only tacitly connected, are now openly combined. With respect to the psychological element in economics, it may be mentioned that this has only recently been emphasised, although beginnings of it are noticeable in ancient philosophy, and are well marked, for instance, in Hume.

One word with regard to the influence of Darwinism, and we close. Dr. Bonar believes that the effect of the doctrine of natural selection is not especially to favor socialism, or, for that matter, any particular plan of social reform. The development of the individual members of society is the chief end of society and the state; as long as human nature remains what it is, the state must exist. But as each individual must use the opportunities assured by the State in his own way, also great individual liberty must be secured; whatever change may be made in the statute laws of property, room must yet be left for personal and moral freedom, for originality, for individual variation: if it is not, mankind will be the losers. μκρκ.

PERIODICALS.

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. Vol. V. No. 6. Vol. VI. Nos. 1, 2, and 3.

ZUR THEORIE DER "FLATTERNDEN HERZEN." By *A. Schapringer.*—NOCHMALIGE ABLEHNUNG DER CEREBRALEN ENTSTEHUNG VON SCHWEBUNGEN. By *Karl L. Schaefer.*

ZUR LEHRE VON DEN OPTISCHEN TÄUSCHUNGEN. By *Franz Brentano.*—DIE BEDEUTUNG DER APHASIE FÜR DIE MUSIKVORSTELLUNG. By *Richard Wallaschek.*—BEMERKUNGEN ÜBER ZWEI AKUSTISCHE APPARATE. By *C. Stumpf.*

EXPERIMENTELLE BEITRÄGE ZUR UNTERSUCHUNG DES GEDÄCHTNISSES. By *G. E. Müller* and *F. Schumann.*—UEBER DIE GEISTIGE ERMÜDUNG VON SCHULKINDERN. By *L. Höpfner.*—UEBER EINE DEPRESSIONSFORM DER INTELLIGENZ IN SPRACHLICHER BEZIEHUNG. By *M. O. Fraenkel.*—EINE SELBSTBEOBACHTUNG ÜBER GEFÜHLSTON. By *M. O. Fraenkel.*—UEBER EINE SUBJEKTIVE ERSCHEINUNG IM AUGE. By *P. Zeeman.*—LITTERATURBERICHT. (Hamburg and Leipsic: Leopold Voss.)

REVUE PHILOSOPHIQUE. Vol. XVIII. Nos. 10 and 11.

L'ABUS DE L'INCONNAISSABLE ET LA RÉACTION CONTRE LA SCIENCE. By *A. Fouillée.*—DU RÔLE DE LA PATHOLOGIE MENTALE DANS LES RECHERCHES PSYCHOLOGIQUES. By *L. Marillier.*—L'ARRÊT IDÉO-ÉMOTIONNEL: ETUDE SUR UNE LOI PSYCHOLOGIQUE.

L'ANCIENNE ET LES NOUVELLES GÉOMÉTRIES. I. L'ESPACE RÉEL EST-IL L'ESPACE EUCLIDIEN? By *J. Delbœuf.*—SUR LES PARAMNÉSIES. By *André Lalande.*—LA CLASSIFICATION DES TYPES MORAUX ET LA PSYCHOLOGIE GÉNÉRALE. By *F. Paulhan.*—SUR LA DÉFINITION DU SOCIALISME. By *E. Durkheim.*—LA DÉFINITION DU SOCIALISME. By *H. Mazel.* (Paris: Félix Alcan.)

A. Fouillée discovers a reaction in the philosophical world against the doctrine of the Unknowable. He reviews the opinions (1) of those who hold that we do not know whether the Unknowable exists, and whether or not it is possible at all, (2) of those who deny its existence, and (3) of those who regard it not only as objectively possible, but even as real. M. Fouillée concludes his article with the statement that "the quite problematic idea of the Unknowable can and must again and again raise the question concerning the entire Knowable, but it cannot reach the domain of science. Neither can the Unknowable diminish, nor can it destroy, our knowledge where it exists. Under these conditions science need not trouble itself about

the transcendent Unknowable which in itself is just as inactive as the gods of Epicurus. The scientist has to think and act in the presence of known or unknown objects according to the laws which are eminent in the Knowable. In order to humiliate the pride of man's scientific accomplishments, let us fall into the exaggerated dogma of Hegel: it is sufficient to think of the Unknown which will become our science.

Concerning the religious aspect of the Unknowable Fonsegrive adds: The Unknowable and the inconscious can as much and as little be the signs of darkness as the signs of light, whether expressing as the Hegelians will placed in Schopenhauer at the origin of the work of all worlds or the inscrutable but adorable Father of the mystics. In fact, one does not adore that which is absolutely unintelligible. One bends one's knee before something which can be conceived and is at least in part knowable. One does not feel that which is quite foreign to human.

M. L. Marillier discusses the import of mental pathology in psychological researches. The article is a very diligent review of M. T. Magnan's publications in Annales Médico-Psychologiques, paying special attention to the hallucinations of alcoholic delirium.

Prof. J. Delbœuf's article on "The Old and New Geometries" is the first of a series which, as we expect, will later on publication in the Revue Philosophique appear in book form. The present article discusses the problem whether real space is Euclidean. The answer which Professor Delbœuf will give to this question in the further development of the problem of space may be gathered from the same author's article in the present number of The Monist which presents his views of the subject with great conciseness and precision.

M. Emile Lasserre in discussing the maladies of memory believes in the possibility of an amnemia perceptive which is called mentality without explaining its cause.

M. Paulhan defines a character as an arrangement of principal predominant tendencies in their mutual relations, and makes some suggestions concerning the classification of the various moral types.

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for the benefit of the present generation and the generations to come," but the present enterprise does not undertake this high office. It attempts only to state that which has happened. Wachler criticises this position and shows that an uninterested standpoint is actually impossible.

MIND. NEW SERIES, No. 8.

A CRITICISM OF CURRENT IDEALISTIC THEORIES. By *Arthur James Balfour.*—ON THE NATURE OF LOGICAL JUDGMENT. By *E. E. C. Jones.*—IDEALISM AND EPISTEMOLOGY. II. By *Prof. H. Jones.*—ON THEORIES OF LIGHT-SENSATION. By *C. L. Franklin.*—TIME AND THE HEGELIAN DIALECTIC. I. By *J. Ellis McTaggart.*—DISCUSSIONS, ETC. (London and Edinburgh: Williams & Norgate.)

THE PHILOSOPHICAL REVIEW. Vol. II. No. 6.

OLD AND NEW IN PHILOSOPHIC METHOD. By *Prof. Henry Calderwood.*—SELF-REALISATION AS THE MORAL IDEAL. By *Prof. John Dewey.*—CERTITUDE. By *Prof. Walter Smith.*—PSYCHOLOGICAL MEASUREMENTS. By *Dr. E. W. Scripture.*—GERMAN KANTIAN BIBLIOGRAPHY. By *Dr. Erich Adickes.*—BOOK REVIEWS. (Boston, New York, Chicago: Ginn & Co.)

INTERNATIONAL JOURNAL OF ETHICS. Vol. IV. No. 1.

MY STATION AND ITS DUTIES. By *Henry Sidgwick.*—WHAT JUSTIFIES PRIVATE PROPERTY? By *W. L. Sheldon.*—THE EFFECTS OF HIS OCCUPATION UPON THE PHYSICIAN. By *John S. Billings.*—THE KNOWLEDGE OF GOOD AND EVIL. By *Josiah Royce.*—A PHASE OF MODERN EPICUREANISM. By *C. M. Williams.* DISCUSSIONS.—BOOK REVIEWS. (Philadelphia: International Journal of Ethics, 118 S. Twelfth Street.)

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THE MONIST.

THREE ASPECTS OF MONISM.

IN the manuscript draft* of the Preface of my forthcoming work in the *Contemporary Science Series* entitled "An Introduction to Comparative Psychology" I have written as follows:

"In a treatise on human psychology it may be possible and advisable to proceed on purely empirical lines and to keep in the background the philosophy of the subject. But in a consideration of comparative psychology such a procedure seems to be neither possible nor advisable. It will conduce to clearness and prevent misconception, therefore, if I state at once that the interpretation of nature which I accept is a monistic interpretation. Now what do I mean by a monistic interpretation? What form of monism is it that I accept?

"First of all I accept a monistic theory of knowledge. The dualist starts with the conception of a subject introduced into the midst of a separately and independently existent objective world. For him the problem of knowledge is how these independent existences, subject and object, can be brought into relation. In the monistic theory of knowledge it is maintained that to start with the conception of subject and object as independent existences is false method, and that the assumed independence and separateness is no-

* This is only a first draft and will undergo modification, amplification, and revision. I quote it here as it stands in my manuscript. I propose to incorporate some of the matter in the latter part of this article.

wise axiomatic. Starting then from the common ground of *naïve* experience it contends that, prior to philosophising, there is neither subject nor object but just a bit of common practical experience. When a child sees a sweet or when a dog sees a cat, there is a piece of *naïve* and eminently real experience upon which more or less energetic action may follow. It is only when we seek to *explain* the experience that we polarise it in our thought into subject and object. But what logical right have we to say that the subject and object which we thus distinguish in thought are separate in existence? No doubt it is a not uncommon and a not unnatural fallacy to endow with independent existence the distinguishable products of our abstract and analytic thought. The distinguishable redness and scent of a rose may thus come to be regarded as not only distinguishable in thought but also separable in existence. But until it shall be shown that 'distinguishable in thought' and 'separate in existence' are interchangeable expressions, or that whatever is distinguishable is also separable, the conclusion is obviously fallacious. And it is this fallacy which the monist regards as the fundamental error of the dualistic theory of knowledge. While dualism, then, starts with what I deem the illegitimate assumption of the independence of subject and object, the monist, starting from the common ground of experience, looks upon subject and object as distinguishable aspects of that which in experience is one and indivisible. It need only be added that this is a theory of knowledge and of the experience of which knowledge is the outcome. Of that which is not known and not experienced it neither asserts nor denies anything. But accepting as it does the reality of experience it does assert that the aspect which we polarise as objective is just as real, and real in the same sense, as the aspect we polarise as subjective. The reality of object and subject is strictly co-ordinate. And those who hold this view regard as little better than nonsense the assertion that whereas the reality of the subject is unquestionable the reality of the object is a matter that is open to discussion.

"Secondly, I accept a monistic interpretation of nature and of man as a product of natural development. The essence of this view is that man as an organism is one and indivisible (though variously

maimable), no matter how many aspects he may present objectively and subjectively. That the inorganic and organic world have reached their present condition through process of evolution is now widely accepted. But the dualist contends that mind is a separable existence, *sui generis*, and forming no part of the natural world into which it is temporarily introduced. Here the monist joins issue and contends that alike in its biological and its psychological aspect the organism is the product of evolution; that mind is not extra-natural nor supra-natural but one of the aspects of natural existence.

"Thirdly, I accept and have attempted to develop a form of analytic monism. Assuming a concomitance between the nervous changes in some part of the brain and the psychical states experienced by the individual whose brain it is, and assuming further that the nervous changes are transformations of energy, it is suggested that what is under its objective aspect a complex series of transformations of energy in the nervous tissue is under its subjective aspect a complex series of psychical states. It is also suggested that something allied to consciousness, that is to say of the same aspect in nature (let us call it infra-consciousness), may be similarly associated with all manifestations of energy. One of my critics, Dr. A. R. Wallace, has objected that this suggestion is only an awkward restatement of that which Schopenhauer formulated with much greater clearness. I venture to think that this criticism shows a misapprehension of my view or of that of Schopenhauer. The essence of Schopenhauer's conception, as I understand it, is that the underlying activity in the objective world, namely, that force of which energy is a manifestation, though not the only manifestation, is but the objective aspect of that which is the underlying activity in subjective experience, namely, will. This is a monistic conception which I accept; but my modification of Clifford's mind-stuff hypothesis, though an allied conception, is not the same as that of Schopenhauer.

"Now analytic monism by itself is insufficient and partial. It is open to the criticism that while professedly monistic it postulates a dual aspect and is therefore merely dualism in disguise. But this criticism falls to the ground when this analytic monism is taken in

association with the monistic theory of knowledge and the monistic interpretation of nature and of man. My monism must be judged as a whole or not at all. Hence I have taken this opportunity of presenting a brief outline of the form of monism which I accept."

On reading the exceptionally interesting number of *The Monist* for January, it occurred to me that it might be of interest to those who have read these articles to read also what I had written and have above quoted; and that I might be allowed here to add somewhat to what I have above so briefly and baldly set forth concerning the three aspects of monism.

THE MONISTIC THEORY OF KNOWLEDGE.

I believe that as *a theory of knowledge* my own view is not very different from that of Dr. Lewins and Mr. McCrie, but both these writers appear to me to assume that what is adequate as a theory of knowledge suffices as an interpretation of nature. Even as a theory of knowledge these are expressions which appear to be awkward or misleading. Dr. Lewins speaks of "exploding 'thing' altogether" and "substituting our own thoughts for objects of all kinds." He says:

> "It is true, or it may be granted, that there is an objective or distal aspect of subjective thought. But that fact, or admission, in no degree invalidates the position that the only objects cognisable are those incorporated with, and by, the subject self, from which all 'things' proceed."

Now if, as I contend, subject and object are of co-ordinate reality, through the polarising action of our thought, I see no reason why "thing" any more than "think" should be exploded; nor do I see why our own thoughts should be substituted for objects of all kinds rather than objects of all kinds be substituted for our thoughts. If there is an objective or distal aspect of subjective thought, this aspect has a reality strictly co-ordinate with the proximal or subjective aspect of things. I profess that I am unable to see why we should speak of a self from which all things proceed rather than of things from which the self proceeds. And when that clear thinker and elegant writer, Miss Constance Naden, says that "every man is the maker of his own cosmos," she would have done well to add

four monosyllables and to write: Every man is the maker of and is made by his own cosmos. Mr. McCrie uses similar expressions. He says:

"No appulse, or outside stimulus, is really thinkable, as external. It is part of the cosmos which, spider-like, I spin from my internal self. And, when I image such externality, I but create it."

I am not sure that I quite understand what Mr. McCrie means by the first part of this passage. It appears to me that the outside stimulus *is* thinkable as external, and that Mr. McCrie must think it as external in the very act of trying to explain it away. To say that spider-like I spin the cosmos from my internal self is unadulterated idealism, just as Mr. Ward's doctrine, that mind is a property of the substance protoplasm, is unadulterated materialism. As a theory of knowledge I should prefer to say: The self and the cosmos are the co-ordinate products of our abstract and generalising thought on the common matter of experience as polarised into object and subject; or, more briefly, self and cosmos are the polarised aspects of experience as explained through reason.

I do not think, however, that there is at bottom much difference between Dr. Lewins or Mr. McCrie and myself on the monistic theory of knowledge, and Dr. Carus is, I feel sure, with me or—let me say more modestly—I with him. It would seem, however, from his article, that Mr. McCrie would make what is a theory of knowledge into an interpretation of nature. He starts with quotations from Professor Veitch which deal with "the subsistence of force that passes out of my perception," and then proceeds to give this further quotation:

"We distinguish ourselves from the object or percept. . . . Are we entitled on this ground to say that its whole reality is identical with its perceived reality? That it may not subsist apart from the time of our perception, either as it is, or in some form capable again of appearing to us as an object, even an object similar to what we now perceive?"

Professor Veitch, without professing to explain the mode of its existence—nay, further suggesting that we may here be face to face with the "insoluble mystery of being"—assumes that it may so sub-

sist. And Mr. McCrie, after some discussion, closes the section with these words:

"*Here is a subject-object relation admittedly fortuitous and temporary.*"

Further on he gives us what he terms the "Open sesame!" of auto-monism.

"Atom, vibration, undulation, mutual attraction, all these *are not*, save as I shape them, and, in the last recess of philosophy, as in the extreme limit of physics, *I am, and there is none else.* 'The cosmic systole and diastole are one with the pulsing throb of my own egoity.'"

Now, the criticism I would make on all this is that what is quite satisfactory as a theory of knowledge is, if I understand Mr. McCrie aright, assumed to be also a satisfactory interpretation of nature. I presume we may take the italicised words "are not" as meaning "are non-existent." I ask Mr. McCrie on what logical grounds he makes this somewhat bold assertion. The theory of knowledge deals with experience, polarises it into subject and object, and so forth. Well and good. But what of that which is, or may be, or may not be, prior to experience and posterior to experience? The theory of knowledge that is modest and knows its business replies, "I do not know. I deal with experience. I can tell you nothing concerning that which is not yet experience or no longer experience. That is a matter of the interpretation of nature." I contend that Mr. McCrie has no logical right to assert or deny anything concerning atom, vibration, and the rest "save as he shapes them" in his experience. He has no logical right to say, "*I am, and there is none else.*" He should sound a more modest note and say: "I am, and what is outside my knowledge I do not know."

The gist of my criticism of Mr. McCrie and those whose views he represents is that though their theory of knowledge is substantially correct, it is by itself insufficient and cannot be regarded as an interpretation of nature or an explanation of that experience with the two aspects of which it deals.

THE MONISTIC INTERPRETATION OF NATURE.

There are some excellent folk who believe that philosophy is possible without assumptions. I am not among their number. Hy-

potheses, or assumptions, are as necessary in philosophy as they are in science.

Mr. McCrie appears to regard as necessarily dualistic the assumption that the world, or, to take a concrete example, a stone on a lonely mountain height, may, when no one is perceiving it, exist "either as it is or in some form capable again of appearing to us as object." The reason is obvious. For him knowledge is coextensive with existence. The stone under the given circumstances is not the objective aspect of a bit of experience; therefore, it is either non-existent or *his* monism falls to the ground; hence he proclaims it non-existent. I prefer the other alternative and contend that his monism is insufficient. But I deny that the assumption is necessarily dualistic in the sense that it is necessarily incompatible with a monistic interpretation of nature. For nature is wider than knowledge.

I assume that the stone on that lonely mountain-top exists "either as it is or in some form capable again of appearing to us as object," whether any one is there to perceive it or not. I cannot possibly prove this. I suppose I accept it for this reason; that of the two hypotheses, (*a*) that it continues to exist in some form or other, whether an object of experience or not, and (*b*) that it dodges in and out of existence according as it is perceived or not perceived, (*a*) satisfies me, while (*b*) satisfies Mr. McCrie. Anyhow, if I cannot prove (*a*), neither can Mr. McCrie prove (*b*). I assume, then, that the world which forms the objective aspect of knowledge continues somehow to exist quite independently of its being perceived. How it exists, I do not know, and (I make this confession with bated breath) after mumbling the problem a good deal in my philosophic teething days I have ceased to care.

That there is a nature to interpret is thus an hypothesis or assumption, the sole justification of which is that the hypothesis, though it can never be proved, accords more satisfactorily with the facts of experience than any other assumption. It does not conflict with the monistic theory of knowledge; it merely fills in the gaps of actual experience with "permanent possibilities" of experience. And now we have got our world, the question is how we are to in-

terpret it. Here I am quite content to accept Dr. Carus's definition of *this aspect* of monism.

"Monism is a unitary world-conception."

Here again I am sure that we ought not to be ashamed of stating frankly the hypothetical nature of our view. We assume that what we call nature is coextensive with knowable existence. We assume that far, very far, as we may be at present from anything like a complete or adequate explanation of nature, it is explicable, and that by one method, the method of scientific procedure. Herein lies the essence of our monism under this aspect. If in the wide region of the known and the knowable (we leave the unknowable for those whom it may concern) there be any modes of existence which not only are not explicable, but from their very nature can never be explicable as parts of one self-consistent whole, our monism falls to the ground. We contend that it is this to which the science, the philosophy, the poetry, aye and the religion, too, when purged of superstitious accretions, has been tending throughout the centuries of human progress.

A monistic interpretation of nature, so long as it holds true to the main principle of being throughout self-consistent, allows any amount of individual freedom in the treatment of details. It is characterised not by the possession of a common scientific or philosophic creed, but by a common aim. It appears to me, for example, that in the evolution which sweeps through nature the underlying activity is throughout characterised by the following traits: (1) it is selective; (2) it is synthetic; (3) it tends from chaos to cosmos. And these traits seem to me characteristic alike of inorganic, organic, and mental evolution. Now I dare say there are not half a dozen independent monists who will agree with me in singling out these three traits for especial prominence. But what does that matter? My aim is monistic as is also theirs. And there is plenty of room for many differences and even divergencies of opinion among those who are in search of a self-consistent theory of thought and things.

ANALYTIC MONISM.

I have already indicated how, in my opinion, a monistic theory of knowledge must be supplemented by a monistic interpretation of nature. Either without the other is incomplete.

I now turn to what may be termed analytic monism. This consists in an analysis of the object of knowledge, or, in other words, of nature, as known and knowable. Now here it is essential quite clearly to grasp the fact that all that we know must, in the act of becoming known, be an object of knowledge. The object of knowledge is not merely the object of sense, but includes also the object of thought. All that we know of the subject, all that we attribute to the self, must, in becoming known, be the object of thought. It is only in reflexion or introspection, which is also retrospection, that this is possible. You cannot analyse any bit of experience at the moment when it is being experienced, you can only look back upon it in a subsequent moment of reflexion. In that subsequent moment it may be polarised into object and subject, and either the objective aspect or the subjective aspect may then be the object of thought. In this way the subjective aspect of experience in moment (n) may be object of thought-experience in any subsequent moment (q). But never can the subject of experience in any moment be the object of knowledge in the same moment. Hence it follows that without reflexion there can be no knowledge of the subjective aspect of experience. And hence it follows also that our knowledge is always dealing with the self of a moment ago. It is an assumption which can never be proved, but one on the validity of which we all place complete reliance, that the subject is continuous and that the subject of the present moment is practically identical with the subject of a moment ago of which we have knowledge through reflective thought.

Let us take that natural object which we call a man, and let us assume that he is constituted in all essential respects as we are. We analyse him in thought; and we may carry our analysis but a short distance or as far as ever we can. Analyse him a little way

down and we reach the conception of body and mind. It is clear that the concepts of this analysis are closely connected in origin with the concepts reached by the analysis of experience, and that body and mind are analogous to object and subject. Now the fact to which analytic monism should, as it seems to me, stick close is, that body and mind are the products of analysis. What is practically given is the man ; and this man is one and indivisible, though he may be polarised in analysis into a bodily aspect and a conscious aspect. It may be said that this is an assumption. Granted. It is part of the fundamental assumption of the monistic interpretation of nature. According to that assumption or hypothesis the organism in all its aspects is a product of natural evolution. We proceed to study that product. We analyse these aspects. We find that a certain group of them hang together in a special way, and we call them bodily aspects; and we find that a quite different group of them hang together in their special way, and we call them mental aspects. There is no getting on without an hypothesis of some kind, and this is the one which the monist adopts. The dualist says that the organism in its bodily aspect is a product of evolution or of some other process of genesis, and that the mind is implanted therein by some extra-natural process. That is his assumption. The future must decide which assumption is the more reasonable.

According to the monistic assumption, then, the organism is one and indivisible, but is polarisable in analytic thought into a bodily and a mental or conscious aspect. Body and mind, like object and subject, are distinguishable, but not separable. And now we proceed to carry the analysis deeper; we reach the brain or some part of it ; and here our analysis discloses as one aspect certain forms of nervous change or transformations of energy, and as the other aspect certain phases of consciousness. Note clearly that this is merely through carrying further the same process of analysis, and that, of the products of analysis, neither can claim priority or superior validity over the other. They are strictly co-ordinate : each is as real as the other. The true reality is the man with which the analysis starts : no valid product of the analysis of that man through the application of rational thought can be more real than another.

THE PARLIAMENT OF RELIGIONS.

THE Parliament of Religions was the name of a drama, played, not in a church, but in a "Palace of Art," with pagan gods in marble watching the performance and wondering what the lesson of it was. This Parliament was a genial transmutation of religious animosities into social friendships, but it was neither Pentecost nor Babel, although it had resemblances to both. It was discords looking for concord among the very same brambles where their enmities grew; a congregation of wanderers in the desert of dead creeds, searching the skies for another pillar of fire and a miraculous pilot-cloud. It was like the old monks praying in gloomy cells for light, and refusing to go outside the cloisters into the wholesome world where the blessed sunshine was.

The advertised object of the Parliament was:

"To unite all religion against all irreligion; to make the golden rule the basis of this union; to present to the world the substantial unity of many religions in the good deeds of the religious life."

This call, while rather indefinite, was construed liberally, as it should have been, because "all religion" may mean a syndicate of all the sects, or it may signify all the virtues in their abstract form, for the meaning of the word "religion" has been much improved in these latter days. "All irreligion," in its new interpretation, may refer to every vice and error, or it may apply, as in the days of religious persecution, to the characters of nonconformists, heretics, unbelievers, malignants, and all who are outside the pale of church, or mosque, or synagogue. Therefore, the value of the purpose must be measured not by the rhetoric of the call but by its actual mean-

missible. The henist has a perfect right to say this is my hypothesis or assumption. You must not reject it simply because it is a different assumption from that which you make yourself. Quite so. It is because I regard it as a different assumption that I welcome Dr. Carus's term henism. Henism must be judged on its merits.

I cannot attempt to discuss Mr. Lester F. Ward's henistic theory of mind. It appears to me to be a restatement of materialism. I have myself passed through a phase of materialistic thought; but I have since then weighed it with due care and found it wanting.

In conclusion I must repeat that, in my judgment, the full strength of monism is not apparent until we view it in its three phases as a theory of knowledge, an interpretation of nature, and an hypothesis which correlates energy and consciousness. Monism must be judged as a whole or not at all. Its cardinal tenets are: that nature is one and indivisible and is explicable on one method, the method of reason; that experience is one and indivisible, though we may distinguish its subjective and objective aspects; that man is one and indivisible, though our analysis may disclose two strongly contrasted aspects, body and mind. It contends that man in both aspects, biological and psychological, is the product of an evolution that is one and continuous; and, combining the results of its theory of knowledge with those of its analysis of man, it identifies the mind, as a product of evolution, with the subject, as given in experience.

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ing. If it means a closer union of all men in the bonds of mutual affection, it is good; but if it means a union of those who practise forms of worship against those who do not, it is bad. The more the sects divided, the safer it was for men; and schism is better than union wherever the churches are strong. The less unity there is in the creeds, the better it is for the religion of knowledge and good works.

As a rule, the appeals for unity were made in a broad and liberal spirit, that said "brotherhood of man," and meant it; but occasionally was heard the old, familiar denial of unity, except upon such terms as the churches may prescribe; for instance, the Rev. Thomas Richey, of the General Theological Seminary of New York, treating the aspiration for unity as a sentimental chimera, said: "Let men dream as they will, it is the power of religion that is the only one unifying bond that can ever bind together the sum of the human family." It was the old formula, the hoary commandment, coupled with a threat, that has carried strife and moral desolation round the world, "You must be brothers in the church, or you shall not be brothers at all." For thousands of years theological religion has been dividing the "human family" into hostile tribes; and now Doctors of Divinity tell us that nothing but religion can reunite that separated family in the bonds of Nature's brotherhood.

There were some wise men in the Parliament who saw the value of dividing religion into religions, and religions into sects, and on this part of the subject the Rev. Dr. Philip Schaff, of New York, said: "Before we discuss reunion, we should acknowledge the hand of Providence in the present divisions of Christendom. Sects are a sign of life and interest in religion." The Rev. George T. Candlin thought otherwise, for in agony of soul he cried aloud, "Our divisions are strangling us."

This cosmopolitan assembly was not strictly a parliament, because extemporaneous debate was absent. It was rather a World's Fair of theological exhibits with a sort of Midway Plaisance attachment for the *bric à brac* of creeds. It was a conventicle where delegates on the platform representing different and opposing liturgies delivered essays on theoretical religion to a miscellaneous laity on

the floor. It was an œcumenical council to compare theologies, although the spirit of non-theological religion found expression in the contributions of the editor of this magazine and some other delegates, who saw the dawn of a new religious era containing less myth and more truth, less creed and more deed, less dogma and more proof.

Toward one another, with few exceptions, the delegates were tolerant, sympathetic, and kind, but there was discord among the creeds. In daily repetitions the orators expanded a sentiment into a religion, and they proclaimed it in a multitude of echoes as "The Fatherhood of God, and the Brotherhood of Man." What they really wanted was a "revised version" of this newer testament. They had been spiritually fed for years on Fatherhood and Brotherhood, but there was not enough of that manna and quail for the wants of the world. They were afraid to say so, but their aspiration was for more Fatherhood in God, and more Brotherhood in Man. While there was in the harmonies of the Parliament a strain of *Te Deum Laudamus*, there was also in the minor keys a wail of *De Profundis*, "Out of the depths I have cried to thee, O, Lord; O, Lord, hear my voice." It was the plaintive cry of disappointed souls for a new God.

If the intention of the congress was to show to heathens, Jews, and pagans, the superiority of Christianity to their benighted faiths, its purpose failed. Long before the end of the Parliament our hymns of self-glory were sung in a penitential key. In the presence of the heathens and the pagans, Christian Doctors of Divinity came to the mourner's bench and made confession that Christianity had imposed itself upon mankind by force, fear, deception, dogmatism, and ceremonials. In sorrow they said that it showed no sanctity of manners for the imitation of other creeds; that as a theory of heaven it was well enough, but that as a rule of righteousness for practical uses on this earth it had not set a good example; and that the time had come for "christianising Christendom."

One day, a visitor impressed by the occasion, said to a friend, "Are the old religions worn out?" The answer was, "No, they are found out." Some of the proceedings justified the sarcasm, for listening to the testimony as it was occasionally given from the plat-

form, the impartial observer wondered whether the old religions were on exhibition for censure or for praise; and whether the Parliament was convened in order to repeal them or merely to repair them and adapt them to the twentieth century. Many of the Christian exhibitors advertised their faith and exalted it above all the others as the moral and spiritual essence of Divinity itself, the only power to save souls and give them life everlasting; and yet Christianity was the only religion there that was accused and condemned by some of its own teachers consecrated and ordained for its evangelical and sacramental work; a phenomenon that puzzled all the foreigners from Greenland's icy mountains to India's coral strand.

At the World's Fair proper, more awards for excellence were given to the heathens than it was thought possible they could win; and so it was at the Parliament. In the competition of religions the heathens carried away the prizes of most value, while the agnostics and the unbelievers cheered. Christianity received "honorable mention" here and there for its material achievements, but its exhibits of moral and religious work were not of a high order. Its mottoes and precepts, its amulets and charms were much admired, but it got no gold medals for its national or international morality. For these reasons there is a suspicion in many pulpits that it was unwise to call the Parliament, and that it has weakened the churches in America. The Rev. Dr. Morgan Dix of New York, in a sermon preached on Sunday November 12, said:

"We have recently been treated to the sight of what was called the Parliament of Religions. I do not believe that those who projected the scheme were animated by any feeling of antagonism to Christianity. I impugn no one's motive. I do say, however, that the Christians who were there were attacking the cross of Christ. I do not forget, but thank God for it, that some strong utterances were heard from Christian men who stood up for Christ in that odd company with as much strength as could be exhibited with courtesy to the other guests. I doubt, however, that if the prime movers of that Parliament had wanted to spread agnosticism they could have made a better move. It was a masterpiece. Through the rose-colored haze of that atmosphere one seems to discern above the heads of the Jewish rabbi, the Indian priest, the Greek patriarch, and the learned advocates of Shintoism, Brahmanism, and Romanism, a banner bearing this inscription, 'To the Unknown God.'"

It was not so much a sacrifice to the Unknown God, as it was

the anticipatory worship of the new God coming with a better dispensation; a prayer for the blending of all souls into one universal soul. As expressed by the Rev. P. C. Mozoomdar, a Hindu priest, "This unity of man with man is the unity of man with God, and the unity of man with man in God is the kingdom of heaven."

There was nothing said against Christianity in the Parliament that had not been said by scoffers and sceptics long ago, and from them it might easily be endured, but it grieved the soul of Dr. Dix that "Christians who were there were attacking the cross of Christ." Perhaps they were only thrown in for emphasis to give pungency to the scolding, but some of the invectives hurled at Christianity by Christian clergymen were somewhat exaggerated, as will appear from the following specimen taken from the address made by the Rev. Dr. Alger of New York: "The great Anti-Christ of the world is the unchristian character and conduct of Christendom. We put the kingdom of heaven in the background and work like incarnate devils for every form of self-gratification."

On the other hand, some of the Christian divines who "stood up for Christ in that odd company," in their exaggerated praise of Christianity made it so aristocratic, arrogant, exclusive, and self-righteous, that its portrait as painted by Dr. Alger was not much improved. A very fair quality of dogmatic and rather uncivil Christianity was presented by Professor Wilkinson, a theologist of Chicago, who "stood up for Christ" and nobody else; and who thought it necessary in doing so to tear away from Christianity all humility and toleration as blemishes on its character. Generously assuming that all our souls are "lost," he maintained that they could be "saved" only in the Christian church, and he said:

> "The only religion that can be accounted true is the religion that is trustworthy to save. . . . Christianity leaves no loophole of escape for the judged and reprobate Anti-Christian religions with which it comes in contact. It shows instead only indiscriminate damnation leaping like forked lightning from the presence of the Lord. The attitude of Christianity towards all other religions is one of universal, absolute, eternal, and unappeasable hostility."

The above certificate of character ought to be accepted, because it comes, not from an untaught superstitious peasant, or a monk of

the dark ages, but from a professor of the University of Chicago, in the latter part of the overrated nineteenth century; not the ninth, but the nineteenth, in fact, almost the twentieth century. Professor Wilkinson fortified his position with many "forked lightning" texts from the Scriptures of the New Testament; but the difficulty with him is that his argument is obsolete.

Professor Wilkinson treated with contempt the "mysteries" of heathen religions; as if there were no "mysteries" in his own. He was immediately followed by the Rev. John Devine of New York, who glorified Christianity for giving to other religions a message of Fatherhood, Brotherhood, Redemption, Atonement, Character, and Service. Like a magician conjuring with his abracadabra, he overawed reason by presenting Christianity to the people as a "mighty mystery." Speaking of its founder, Mr. Devine explained that "in taking the form of man he did not seek the permission of ordinary laws, but he came in his own spiritual chariot in the glory of the supernatural." That is very much like the African theology that prevailed among the negroes in the days of slavery. They could not imagine any person going into heaven, or coming out of it, except in a "chariot." As hope was forbidden them in this world, they found some consolation in believing that some day they would be riding over the golden pavements of the new Jerusalem in a "chariot." They thought that when the sorrows of this life were over they would be carried up to heaven in a "chariot," and they lightened their bondage a little by singing "Swing low, sweet chariot, coming for to carry me home." If the Christian religion is a "mighty mystery," then revelation reveals nothing, but conceals everything, and instead of solving religious puzzles, it creates them.

The belief was present in some of the divines that if the Roman Catholic Church could be excluded from it, Christianity would get along very well, while some others thought that the only religious unity possible was in the Church of Rome. The Rev. Mr. Maury, a French Protestant said, "The French people hold in abhorrence intolerance and hypocrisy, so that they could never endure the spirit of Jesuits and Pharisees." The Rev. Mr. Gmeiner, a Catholic, was of a different opinion, for he said: "The religion of Christ will

ultimately reunite the entire human family in the bonds of truth, love, and happiness." In his enthusiastic imagination, he conjured up an impossible future, and beheld, as in a vision, science again the bond-maid of religion in the service of Rome; the restoration of those benighted centuries, when men had the minds of asses, without the asinine bravery to kick; when the king owned the bodies of the people, and the bishop owned their souls; for, said this hopeful prophet, "the true home for all under God is the Holy Catholic Church." The science of his religion had convinced this learned ecclesiastic that man had not lived upon this planet longer than ten thousand years. The limit allowed by theology was formerly six thousand years, but he was willing now to grant four thousand additional years.

To the possible dismay of that reverend father, Mr. M. T. Elder, a Roman Catholic from New Orleans, came into court, gave himself up, and turned state's evidence against his church. He complained that it was losing strength and reputation, and that it was not great either in achievements or in men. He seemed to think that it was deficient in moral genius and intellectual vitality. With some bitterness of sorrow, he said:

"The great men of this nation are and will continue to be Protestant. I speak not of wealth, but of brain, of energy, of action, of heart. The great philanthropists, the great orators, the great writers, thinkers, leaders, scientists, inventors, teachers of our land have been Protestant. What does surprise me is the way we have of eulogising ourselves, of talking buncombe and spread-eagle, and giving taffy all round. But, truly, I cannot. When I see how largely Catholicity is represented among our hoodlum element, I feel in no spread-eagle mood."

Although the style of Mr. Elder was not a model of elegance, many of the addresses delivered by Christian delegates displayed eloquence of good literary quality; but much of it was pulpit eloquence, asserting, declaring, and proclaiming, without condescending to anything so rudely secular as proof, or even evidence; for instance, the Rev. Dr. Burrell, of New York, in a gush of scriptural metaphor and psalm, poured out his rejoicings thus:

"God be praised for this congress of religions. Never before has Christianity —the one true religion—been brought into such open and decisive contrast with

the other religions of the world. This is indeed the Lord's controversy. The altars are built, the bullocks slain, the prayers are offered, and the nations stand beholding. Now, then, the God that answered by fire, let him be God."

This was a dangerous challenge, the language musical enough but it was gong-music, emotional declamation, and defiance. The Oriental Gentiles on the platform, guests of the Christian theologians, listened with heathen courtesy, while their entertainer gave them to understand that his particular special theology was the "one true religion"; and they looked at him with polite wonder when he challenged them to test it by the ordeal of fire, a plan of judgment that never was very truthful, and one that has long been abandoned by civilised law. Had the heathens and the pagans accepted the challenge, Dr. Burrell would certainly have lost, for God no longer decides by fire the vainglorious wagers of men. It is true, according to the Scriptures, that God answered by fire the appeal of Elijah, and thus enabled the Hebrew prophet to win the wager he had made with the prophets of Baal, but that was under the old dispensation, and such a miracle will never be done again. It is also true, according to the same authority, that Elijah took the losers down to the brook Kishon and "slew them there." A religion that stakes its character or its truth on the fiery ordeal by which Elijah won his victory at Mount Carmel, is rash when it invites a contrast between itself and other faiths; and it is doubly rash when it presents the tragedy of Kishon as a specimen of its toleration and its mercy.

Forgetting the work of their own missionaries, the Christians in the Parliament thought that the heathens there would bow down reverently before the spiritual splendors of Christianity, but the Mohammedans and the Buddhists and the Brahmans told them that the heathens knew Christianity well. They were sorry they could not give it a good character, because it had corrupted the manners of their people, broken the faith of treaties, fomented sedition, prevailed by violence, and had made the cross a menace to their freedom and the symbol of their subjugation. Satsumchyra, a Brahman priest, comparing the hypothetical Christianity of England and America with the "applied" Christianity of his own country, said:

"Our friends here have been picturing to you Christianity standing with the Bible in one hand and the wizard's wand of civilisation in the other, but there is another side, and that is the goddess of civilisation with a bottle of rum in her hand. Oh, that the English had never set foot in India! Oh, that we had never seen a Western face! Oh, that we had never tasted the bitter sweets of your civilisation, rather than that she make us a nation of drunkards and brutes."

And Horin Toki, after enumerating the blessings conferred by Buddhism upon Japan, said: "It is a pity that we see some false and obstinate religionists have been so carelessly trying to introduce some false religions into our country."

One day the Parliament was violently shaken by the speech of Kinza Ringa M. Hirai, a Buddhist from Japan. This address was very nearly Christian in its combative accusations and replies. With spiritual and ideal Christianity M. Hirai had no quarrel; in fact, he expressed great admiration for it; but he condemned the actual and material Christianity that had invaded the empire of Japan, and he sarcastically resented the inhospitable welcome given to the Japanese by the Christians of California. In his complaint, he said: "Among the innumerable unfair judgments, the religious thought of my countrymen is especially misrepresented, and the whole nation is condemned as heathen." He declared that the Japanese were not sectarian; that the wise and virtuous thoughts of all religions were adopted in Japan, and that from the beginning of her history, Japan "has received all teachings with open mind."

Having asserted that the religion of Japan was not at all jealous of other faiths, M. Hirai spoke freely of the injustice practised on his people by the Christians, and he said that among the vices brought into Japan by Western civilisation there were some "which were utterly unknown before and entirely new to us—heathen, none of whom would dare to speak of them even in private conversation." M. Hirai showed also that in the religion of diplomacy the Buddhists were as infants in the hands of the Christians. He proved that in the making of commercial and political treaties between his countrymen and the Western powers, the Japanese had been cheated in a systematic and highly civilised way. Further, that all efforts to revise and amend those treaties, so as to put them on the plane of

justice, had been consistently and persistently defeated by the Christians. It is not surprising that, smarting under experimental Christianity, M. Hirai should look with suspicion upon the emotional goodness and metaphysical benevolence of the Christian religion.

Under the meek and gentle exterior of the Orientals there was a stratum of what goes by the name of manly spirit. They were slow to anger, but they resented insult, for when the Rev. Dr. Pentecost of London, after advertising his own exhibit in a very boastful way, and contemptuously diminishing the Hindu gods, as not at all to be put in comparison with Christ, reflected with some coarseness on the chastity of those women who serve in the temples of India, a Hindu delegate, Mr. Gandhi, repelled the sneer as a calumny, and rebuked the self-righteousness of the critic by pouring pity on his head in this way; he said:

"This platform is not a place for mutual recrimination, and I am heartily sorry that from time to time a most un-Christian spirit is allowed free scope here, but I know how to take these recriminations at their proper value. . . . Some men in their ambition think that they are Pauls. These new Pauls go to vent their platitudes upon India. They go to India to convert the heathens in a mass, but when they find their dreams melting away they return to pass a whole life in abusing the Hindu. Abuse is not argument against any religion, nor self-adulation a proof of the truth of one's own."

This was dignified and severe, but lest the rebuke might fall upon other Christians, innocent of offence, Mr. Gandhi, with refined courtesy, spoke of the unfriendly censure cast upon the faiths of India, as proceeding from an "un-Christian spirit." There is an invisible, intangible ideal that appeals to the generous imagination as the "Christian spirit," but we must confess that often in its actual visible form, and in all theological comparisons, it is the spirit shown by Mr. Pentecost. It is incurable, because the opinion of many Christians is that Christ is gratified by flattery, and those who thus exalt him, think they escape the condemnation and come within the blessing of the promise, "Whosoever, therefore, shall confess me before men, him will I also confess before my Father which is in heaven. But whosoever shall deny me before men, him will I also deny before my Father which is in heaven." Professor Wilkinson

was frank and honest when he declared that the attitude of his own religion toward every other is one of "universal, absolute, eternal, and unappeasable hostility." That is not merely a sentiment; it is history, and the explanation of it given by some people is that Christianity in the Wilkinson form is not the religion of Christ.

Several of the delegates presented essays on "The Personality of God," and in this discussion the Christians had the best of it, because they exhibited God as an exaggerated man, a concrete personality, a giant omnipotent, easy to comprehend even by the men who lived in the lower Silurian age of learning. Professor Valentine, a Lutheran, said:

"In Christian teaching, God is a personal being, with all the attributes or predicates that enter into the concept of such a being. In the Christian Scriptures of the Old and New Testaments this conception is never for a moment lowered or obscured. God, though immanent in nature, filling it with his presence and power, is yet its Creator and Preserver, keeping it subject to his will and purposes, never confounded or identified with it. He is the infinite, absolute personality."

It may be, that in the Scriptures "this conception of God is never lowered," for it is not easy to lower it, unless we make a "concept" of God lower in rank than man. Even in the Scriptures this conception of God, though never lowered, is very often raised; and outside the Scriptures, too, it is raised by all enlightened men to moral and philosophical heights where idolatries never fly. Even the Hindu conception of God raises the Deity to a higher plane than the convenient shelf within easy reach where Professor Valentine puts his image. Manital Ni Dvivedi, of Bombay, said:

"This word God is one of those which have been a stumbling-block to philosophy. God, in the sense of a personal creator of the universe, is not known in the Veda, and the highest effort of rationalistic thought in India has been to see God in the totality of all that is."

The childish conception of Deity which prevailed when men first became afraid of God is thus compassionately treated by the Hindu.

"I humbly beg to differ from those who see in monotheism, in the recognition of a personal God apart from nature, the acme of intellectual development. I believe that is only a kind of anthropomorphism which the human mind stumbles

upon in its first efforts to understand the unknown. The ultimate satisfaction of human reason and emotion lies in the realisation of that universal essence which is the all."

As might have been expected in a parliament of religions, nearly all the delegates who spoke on that subject proclaimed the personality of God, although the form and quality of that personality changed like the shape of a cloud. It varied according to the faith and fancy of its advocates. Sometimes it was a sentiment, a hope, an intuition, and at other times a demonstrated fact. It appeared as a natural instinct, and also as a supernatural revelation. In one address it was a spiritual perception, and in another an intellectual result. Some thought that God was omnipotent, while others believed that he was bound by the impossible, like any mortal man. Amid the differences, there was a strong opinion that reason was not at all to be trusted in the search for God. The Rev. A. F. Hewitt, of the Paulist Fathers, made a very learned, eloquent, and ingenious attempt to place the personality of God on a scientific and logical foundation, and at the end of it confessed his own failure by calling, for assistance, on the supernatural. He said:

"It is the highest achievement of human reason to bring the intellect to a knowledge of God as the first and final cause of the world. The denial of this philosophy throws all things into night and chaos, ruled over by blind chance or fate. Philosophy, however, by itself does not suffice to give to mankind that religion, the excellence and necessity of which it so brilliantly manifests. Its last lesson is the need of a divine revelation, a divine religion, to lead men to a knowledge and love of God."

Supporting the argument of Father Hewitt, the Rev. Dr. Momerie rejected the "accident" theory and asserted that, "if the world is not due to purpose, it must be the result of chance"; but he soon broke away from his theology into the open fields of nature, where, according to Dr. Momerie, even God must obey the law. He said:

"When we say that God cannot do wrong, we virtually admit that he is under a moral obligation or necessity, and reflexion will show that there is another kind of necessity, viz., mathematical, by which even the infinite is bound."

All these bewildering guesses bring to mind the despair of the prophet when, lost in the labyrinths of the puzzle, he exclaimed:

"Who by searching can find out God?" Hard as the problem is, there are men who think they have discovered him in the infallible almanac, where it foretells, with scientific faith, the time of the eclipses, the rising and the setting of the sun, and the ebbing and flowing of the tides; while others think they have discovered him in supernatural revelations, although no two of their conceptions are alike. Jinanji Jamshedji Modi, a disciple of Zoroaster, said: "Evidence from nature is the surest evidence that leads a Parsee to a belief in the existence of the Deity. From Nature he is led to Nature's God"; but Dr. Isaac M. Wise, a Jewish rabbi, said: "All knowledge of God and his attributes comes to man by successive revelations, of the indirect kind first, which we call natural revelation, and the direct kind afterwards, which we call transcendental revelation." He did not explain the necessity for two revelations, and Horin Toki, a Buddhist bishop, denied them both. He looked upon the natural and the transcendental revelations of God as alike the creations of spiritual hasheesh, and he said: "We trust in the unity of truth and do not believe in the Creator fancied out by the imperfect brain of human beings." This was a discord in the Parliament, but it was neither harsh nor loud, and it was rather a concession to the doctrine that the "imperfect brain" of man is not at all to be trusted as a theological guide. With a different purpose the same thought was used by the Rev. S. J. Niccolls, of St. Louis, who believed that the Creator could not be "fancied out" by any human brain, but was manifested through the power of religious feeling; and as to the question of God's personality, he said:

"We cannot bring to its contemplation the exercise of our reasoning faculties in the same way that we would consider some phenomenon or fact of history. He who is greater than all hides himself from the proud and self-sufficient; he reveals himself to the meek, lowly, and humble of heart. It is rather with the heart that we shall find him, than by pursuing him merely with our feeble intellects. To-day, as always, the heart will make the theologian."

This was the key-note of despair, the knell of the debate, for ecclesiastics of high rank had been trying for many days to convince the "reasoning faculties" that God is a personality; and then comes a Presbyterian Doctor of Divinity, and tells them that it is useless

to address the reason, for "to-day, as always, the heart will make the theologian." The brain is dangerous, for logic lies there, and thinking-machines in the front of it make heretics, while the heart makes theologians. The argument is that men who exercise their minds, and make themselves intelligent, thereby become "proud and self-sufficient," and that God "hides himself" from them. But why should God hide himself at all? And why should the "reasoning faculties" of men be a terror to theologians?

The dual theology of old was practically abandoned by the Parliament, for the Devil was treated as a myth vanishing away. This was evidence of a radical change, for it is not long since men believed in a personal Devil as religiously as they now believe in a personal God, and in England, the Devil, was a personality "established by law." In all indictments it was charged that the defendant, "not having the fear of God before his eyes, but being moved and instigated by the Devil," did commit the crime of which he was accused; and he who doubted the existence of the Devil was anathema. True, as the "evil principle" or something of that sort, the arch-fiend occasionally walked across the platform like the ghost of Hamlet's father, but he received scant welcome, and soon faded into chaos. In fact he is Chaos now, according to the "revised version" as it was expressed by Mr. W. T. Harris, United States Commissioner of Education, who said: "God only is an absolute person. His pure not-me is chaos, but not a personal Devil." This made it necessary for Mr. Harris to revise the venerable dogma that the atonement was the payment of a debt due the Devil, and he presented what he called "a new theory of the death of Christ as a satisfaction, not of the claims of the Devil, but as a satisfaction of the claims of God's justice for sin." The revision presented by the Commissioner of Education was well received, and one of the delegates remarked that the new theory was "more rational" than the old one. Although the existence of the Devil was denied, a suspicion prevailed that he was yet alive, and that he was not in the ranks of the "unemployed," for Jinanji Jamshedji Modi, the Parsee, said: "The Zoroastrian idea of the Devil and of the infernal kingdom coincides entirely with the Christian doctrine. The Devil is a murderer and the father of lies,

according to both the Bible and the Zend Avesta." The conclusion is that so long as murder and lies remain the Devil is alive and well.

Satan, as a personality, having been dismissed from the service, there was no longer any religious use for "the infernal kingdom," and so that lurid bit of ancient orthodoxy passed from the real to the imaginary, and became a harmless figure of speech, a metaphysical corner of the conscience where lies the torment of the soul. According to the Rev. Charles H. Eaton of New York, "Hell is a spiritual and personal fact but has no objective existence"; and, indeed, something like that was the explanation of Heaven. It was purely a subjective revelation and a spiritual dream; "not a locality," they said, "but a state of mind."

The Rev. Joseph Cook of Boston, a very athletic Doctor of Divinity, having used up all the superlative adjectives of excellence to describe the Bible, hurled a sneer at the enlightened Greeks, and said:

"I take up the books of Plato, which I think are nearest to those of the Bible and press those clusters of grapes and there is an odious stench of polygamy and slavery in the resulting juices."

This clamorous comparison blown into the amphitheatre as from a brass trumpet, like the challenge of Brian De Bois Guilbert in the tournament at Ashby, was bold in its defiance of the Bible evidence, but it retreats into silence before the sorrowful cry of a woman. Mrs. Fannie Williams, a colored woman, and therefore an expert witness, said:

"Religion, like every other force in America, was first used as an instrument and servant of slavery. All attempts to Christianise the negro were limited by the important fact that he was property of a valuable and peculiar sort, and that the property value must not be disturbed, even if his soul were lost. If Christianity could make the negro docile, domestic, and less an independent and fighting savage, let it be preached to that extent and no further."

That mournful accusation uttered in a gentle voice rang out as when the cuirass of the haughty templar was hit by the spear of the Disinherited Knight, and a sympathetic vibration came back to the little woman from the heart of every man in the hall. Further, she said:

"Such was the false, pernicious, and demoralising gospel preached to the American slave for two hundred years. But bad as this teaching was it was scarcely so demoralising as the Christian ideals held up for the negro's emulation. When mothers saw their babes sold by Christians on the auction block in order to raise money to send missionaries to foreign lands; when black Christians saw white Christians openly do everything forbidden in the decalogue; is it not remarkable if such people have any religious sense of the purities of Christianity? 'Servants obey your masters' was preached and enforced by all the cruel instrumentalities of slavery, and by its influence the colored people were made the most valued slaves in the world. The people who in Africa resisted with terrible courage all invasions of the white races, became through Christianity the most docile and defenseless of servants."

The spirit, broken by what she called "the slave Bible," appears to have been inherited by Mrs. Williams, for she still walks among the churches, wondering where the seats for the colored Christians are; groping in the Christian temples behind the "color line," in search of that "holy communion" which is not for her, nor for her people. Her soul, scarred by the lash of the slave driver, seeks for healing and recompense at the altars of the men who plied the lash. She still believes in the "slave Bible," and worships a Christian ideality. In her own eloquent way, she said: "The hope of the negro and other dark races in America depends upon how far the white Christians can assimilate their own religion." There is pathos in that hope, for at the bottom of it is despair. If the white Christians have never yet been able to assimilate their own religion, what reasonable prospect is there that they will do it now?

It may be that the censure of Christianity by Christians is an argument in its favor, proving that it is able to stand fire, and that it has within itself the spirit of toleration and reform. This may explain the good-natured mocking and scoffing at the canonical mysteries by some "open and avowed" Christians. Here is a specimen from the genial humor of Dr. Momerie of London:

"Christ taught no dogmas, Christ laid down no system of ceremonialism. And yet, what do we find in Christendom? For centuries his disciples engaged in the fiercest controversy over the question, 'Whether his substance'—(whatever that may be—you may know, I don't)—'was the same substance of the Father or only similar.' They fought like tigers over the definition of the very Prince of Peace. Later on Christendom was literally rent asunder over the question of 'whether the Holy Ghost proceeded from the Father to the Son' (whatever that may mean). And

my own church, the Church of England, has been, and still is in danger of disruption from the question of vestments—and clothes."

That sarcasm is comical enough but in all religions that appeal to the imagination and the emotions, vestments and clothes perform an impressive and awe-inspiring part. In Ireland the peasants think they give additional solemnity to their statements when they swear "by the holy vestments," and this proves that the emblematic meanings of surplice and gown, cope and stole, mitre and cowl, are essential parts of ceremonial religions; they ornament the ritual itself; they hypnotise the congregations by tinselled robes embroidered with cabalistic signs, and they make adoration fervent through spiritual fear. Dr. Momerie may not know it, but it is not impossible that their secret spell is part of the fascination that keeps him in the Church of England.

Dr. Brodbeck, of Hannover, Germany, had a new religion fresh from the mint of his own imagination, and he called it "Idealism." After it had been explained by the help of many negations, it proved to be a bright and airy nothing, as easy to grasp as a rainbow. It was not a religion, but a retreat from all religions, a flight in a balloon to the clouds. It was even sceptical of science, and had some doubts about the canons of geometry. In comprehensive denials Dr. Brodbeck said:

"The new religion is not a philosophical system of any kind. It is not atheism, not pantheism, not theism, not deism, not materialism, not spiritualism, not naturalism, not realism, not mysticism, not freemasonry; nor is it any form of so-called philosophical idealism. It is not rationalism, and not supernaturalism; also not scepticism, or agnosticism. It is not optimism, and not pessimism; also not stoicism, nor epicureanism; nor is it any combination of these philosophical doctrines. It is also not positivism, and not Darwinism or evolutionism. It is also not moralism, and is also not synonymous with philanthropism or humanitarianism."

From all those denials it may be assumed that the new religion of Dr. Brodbeck is not a mountain, or a valley, or a lake, or a house, or a ship, or a load of hay. It is the ghost of the indefinable "What is it," that Mr. Barnum used to show, and it is harder to catch than the sea-serpent of delirium tremens. All good people are eligible for membership in Dr. Brodbeck's church, but they must

not be too good, for he says: "We are not in favor of extremes; in most cases virtue is the middle between extremes." This religion ought to be popular as a sort of half-way "split the difference" compromise between the principles of good and evil, between the canons of right and wrong.

The original founder of agnosticism was not Professor Huxley, but poor Jo, the crossing-sweeper, who "never knowed nothink," and although Dr. Brodbeck repudiates agnosticism, he must belong to the sect of Jo, for he says: "We do not know how things originated, or if they did originate at all; so we do not know what will be the last end and aim of everything existing, if there is anything like last end and aim at all"; and so he patronisingly leaves these and kindred problems, especially the hard ones, to "science." "We do not know," says Dr. Brodbeck, "where we come from nor where we go. We do not believe in the resurrection, nor in the immortality of individuals, and so we leave it to science to decide how far there can be any existence after death." Dr. Brodbeck and his disciples do not believe in heaven, "because astronomy is against such a belief"; nor in hell, probably for geological reasons; but, he says, "we acknowledge willingly the relative truth of those and similar dogmas." This admission at once invalidates Dr. Brodbeck's patent on a new religion. Belief in the absolute error and the relative truth of certain dogmas is not a new religion, but an old one. The new religion that is coming will not believe in the relative truth of any doctrine, article, code, or sacrament that is positively false.

One pleasant feature of the Parliament was the high character of the delegates, their learning, their eloquence, their hope for more truthful creeds, and the spirit of toleration that actuated most of them. Their courtesies were intentional, and as the essays were independently written, and not in contradiction of one another, their disagreements were accidental, resulting from differences of race, language, education, customs, and mental constitution; but the discords were inevitable, because the religions of mankind are, from the nature of their separate claims, irreconcilable. It was a promise full of hope to all mankind when priests, presbyters, and bishops of opposing creeds declared that they would never again be so in-

tensely religious as to hate one another; and the personal good nature of the delegates, excepting two or three, justified the boasting of Dr. Momerie when he said: "And here on this platform have sat as brethren the representatives of churches and sects which during by-gone centuries hated and cursed one another; and scarcely a word has fallen from any of us which could possibly give offence."

Human sympathy is catching; it is liable also to take the form of an epidemic and spread far beyond the boundaries we have set for its operation. When the representatives of churches and sects cease to hate and to curse one another, they will very likely cease to hate and to curse poor sinners, and that unbelieving multitude whose "reasoning faculties" have tempted them to go outside of all the churches and all the sects in search not of everlasting life, but of eternal truth, without which all religions are idolatries and everlasting life itself is worthless. If the Parliament shall make love instead of hate the stimulus of religious controversy, its influence for good will far exceed the educational benefit of the great Fair; for if the representatives of churches and sects display toleration and charity, the congregations will catch the benevolence, for as Dr. Momerie himself said: "It is the clergy who are responsible for the bigotry of the laity."

The climax, or anti-climax, of the debate appeared on the last day of the Parliament in the speech and person of Christopher Jibarra, "Archimandite of the Apostolic and Patriarchal Throne of the Orthodox Church in Syria and the Whole East." The religion of the Archimandite was as broad and comprehensive as his name and title, for he had the magnanimity to say, "I believe that God has preserved the Koran, and also preserved Islam, because it has come to correct the doctrines and dogmas of the Christians." This opinion coming from a Christian prelate of high rank made a great sensation, for it was a confession that Islam instead of corrupting Christianity had reformed it; but the right reverend confessor went farther than that, and made a greater sensation when he proposed that both of them be superseded by something better than either, and he was generously willing to leave the making of this new religion to the inventive genius of the Americans. He said: "As Co-

lumbus discovered America, so must Americans find a true religion for the whole world, and show the people of all nations a new religion in which all hearts may find rest."

The greatest sensation of all was in reserve, and it came like sudden thunder when the Archimandite, imitating American customs, began to talk, not like a cloistered abbot, but like a free and enlightened fellow-citizen. As if he had been trained all his life in American politics and was merely taking part in a national convention, he proposed that all their conflicting theologies be referred to a committee on resolutions with instructions to report a platform of principles for the new religion. He said:

"All the religions now in this general and religious congress are parallel to each other in the sight of the world. . . . From such discussions a change may come, perhaps even doubts about all religions. . . . Therefore, I think that a committee should be selected from the great religions to investigate the dogmas and to make a full and certain comparison and approving the true one and announcing it to the people."

There was nothing visionary or theoretical in that proposal; it was eminently practical; but unfortunately, the committee was not appointed, the great opportunity was lost, and the phantom of unity which the Parliament had been chasing for three weeks disappeared.

Although the unity of God was the prevailing sentiment of the Parliament, the dual character of Holy Writ was confidently declared by some individual delegates, who asserted that while it might be scientifically false in certain places, it was even in those very errors religiously true. Its theological accuracy was not at all impaired by its philosophical mistakes, and the Rev. Dr. Briggs, fresh from his heresy trial, said:

"We are obliged to admit that there are scientific errors in the Bible, errors of astronomy, geology, zoölogy, botany, and anthropology. . . . . There are such errors as we are apt to find in modern history. . . . But none of the nistakes which have been discovered disturb the religious lessons of the biblical history."

This is true only when the so-called errors are in parables, or in language obviously figurative or allegorical. When they appear as realities, revealed by divinely inspired prophets and apostles, their mistakes do seriously "disturb the religious lessons" they pre-

tend to teach. A statement which is historically false cannot be divinely inspired, nor can it be religiously true. Do those doctors of divinity, who so devoutly worship God, believe that he ever inspired his prophets to make mistakes in astronomy, in geology, in history, or in anything? And do they believe that he needs any such mistakes to aid him in the moral government of the world, or in the religious instruction of mankind? Do they think that a falsehood, as soon as they make it "scriptural," becomes true? There never was a book so sacred that it could sanctify a lie. All truth is holy, whether it be written in books, or stones, or stars; and all error is unholy, no matter in what scriptures it may be.

Dr. Briggs made this confession from the platform of the Parliament: "We cannot defend the morals of the Old Testament at all points." If so, the Testament ought to be revised, and all those points excluded from it that cannot be defended; for so long as they remain in it they teach false theories of morals to multitudes of men, women, and children, who are not so learned as Dr. Briggs, who accept the whole of the Testament as true, and who believe it "at all points" and at every point as the infallible word of God. Morals that cannot be defended ought to be condemned. It is not within the power of the Sanhedrim, or the Synod, or the Œcumenical Council to convert bad morals into good religion, or to make Holy Scriptures out of errors in astronomy, geology, zoölogy, botany, history, and anthropology. Whether the delegates intended it or not, that was the lesson of the Parliament.

Some of the delegates gave a new definition to the word "religion," making it a system of work instead of worship, of practice instead of prayer. Amid signs of general approval, the Rev. Dr. Hirsch, a Jewish Rabbi, said, "Character and conduct, not creed, will be the keynote of the gospel in the church universal." Others expanded the word until it became large enough to include the science of mathematics as well as the moral code, and they made every truth eligible for membership in the new communion, and every error "cursed and excommunicate."

The Parliament provided a sort of intellectual crucible in which all the creeds will be tested and purified as by fire. That sectarians

of a hundred theologies have brought them to the furnace is a sign of social progress, and a promise of larger toleration. He who fears the fire has no faith, for whatsoever is true in his religion will come out of the furnace as pure metal, leaving the dross to be thrown away.

M. M. TRUMBULL.

CHICAGO.

MODERN PHYSIOLOGY.

IF we define physiology in broad terms as the science of the phenomena of life, and characterise as its object the investigation of the phenomena of life, physiology is a very old science; as old, indeed, as human reflexion on any of the processes of nature. But the character of physiological thought has undergone in the course of the development of the human mind such manifold and profound changes that physiology has exhibited in different periods quite different aspects. So that for a critical judgment of the present state of the science a retrospect of certain phases of its past history, is very important.

THE EARLY VITALISM.

In the sixteenth century, after the long intellectual night of the Middle Ages, a sweet, refreshing zephyr proclaimed the dawn of a new era for all fields of human thought,—for art and philosophy, for science and medicine. Physiology did not lag behind in the new development. The exact method of natural inquiry, founded by men like Copernicus, Kepler, Galileo, Bacon, and Descartes, was, by Harvey's classical investigations on the circulation of the blood, also introduced into physiology, which at that time was still based on the old system of Galen. How greatly the rise of the exact critical method of inquiry promoted and stimulated the further development of physiology is best seen by the powerful growth of the two great schools of the seventeenth century, the *iatro mechanical* (iatro-physical, iatro-mathematical) and the *iatro-chemical*, the first of which, founded by the brilliant Borelli, sought to explain the phe-

nomena of life by the principles of physics, while the latter, founded by Sylvius, more especially employed the laws of chemistry for the explanation of the vital processes. Physiology was thus transformed into a physics and chemistry of the human body, an enormous number of physiological facts were disclosed, numerous theories were promulgated, and in the year 1757 Haller was able, on the basis of a stupendous mass of material, to give to the scientific world for the first time, in his "Elementa Physiologiae Corporis Humani," a large compendium of physiology.

But the hopes of the iatro-mechanical and iatro-chemical schools to explain all phenomena of life by the principles of physics and chemistry fell far short of realisation. Since the establishment and development by Glisson, Haller, John Brown, and others, of the doctrine of irritability, this latter property was recognised as a quite universal attribute of living organisms, as distinguished from inorganic bodies; physicians thought beyond a doubt that they saw in irritability the essence of life. But what was irritability? Here was something that did not admit of immediate physical or chemical explanation.

Perhaps it was lingering traces of the animism of Stahl, still fresh in the minds of scientists, or perhaps reminiscences of the mediæval notions of *πνεῦμα*, *δύναμις*, *spiritus*, and so forth, outgrowths of the doctrines of the ancient pneumatic physicians, that in the face of the difficulties of explaining mechanically the nature of the phenomena of life matured a doctrine which was subsequently to be of far-reaching consequence in physiology. Namely, the theory of *vitalism*.

The argument which forms the basis and gist of the theory of vitalism is as follows: since the processes of life do not admit of explanation by physical and chemical forces, there must be active in living organisms some other force which produces the phenomena of life, a force of a different kind from that which physics and chemistry take cognisance of, a vital force, *vis vitalis*, *Lebenskraft*, *force hypermechanique*.

The defect of this reasoning is manifest. All proof of the correctness of the minor premise is wanting. For, if hitherto and with methods which now exist, certain vital processes have not been re-

duced to physical and chemical causes, it follows by no means from this fact that *in a last analysis* they may not be conditioned by chemical and physical causes, or that *in the future* they will not be reduced to such. Vitalism, therefore, is simply a dogma of convenience.

Vitalistic ideas first appeared in the French schools of medicine, especially at Montpellier. In the track of the latter followed the German school of vitalism, whose founder was Reil. With most of the vitalists the vital force was thoroughly mystical, and never received a precise definition. In this fact its great convenience lay. Men spoke of a *nisus formativus* when they wished to explain why from the egg of a snake always a snake was developed, and from the egg of a bird always a bird. In some few exceptional cases though, by clear-headed thinkers, who would not rest satisfied with a hazy word, the idea actually was more precisely defined, but in such cases it almost always turned out that the essential principle of vitalism was sacrificed.

Johannes Müller, the greatest physiologist that the history of our science has produced, was a vitalist. He reckoned with a vital force. But in so clear a mind as Johannes Müller's, the idea of vital force could not preserve the slightest tinge of mysticism. To him, vital force was simply a peculiar, characteristic complex of the special factors which are realised in living bodies and form the basis of their expressions of life, but not an entity that worked in a manner opposed to chemical and physical laws. Subsequently, indeed, the term vital force was used in different senses, and even in Johannes Müller's time it no longer possessed a uniform significance, although it was then deeply rooted in physiological thought. Still, the unclear notion of a vital force was not definitively dispelled until the epoch of the great achievements of modern natural research, of comparative anatomy and of evolution, of the theory of descent and natural selection, of the investigations of chemical physiology, and above all, of the discovery of the law of the conservation of energy; and with the dissipation of this notion, the theory of vitalism was overcome.

THE PRESENT STATE OF PHYSIOLOGICAL RESEARCH.

Psychologically, it is a highly interesting phenomenon, and one of moment in the history of science, that now, almost immediately after the final suppression of the old vitalism by the new development of the natural sciences, we have again arrived at a point which corresponds in the minutest details to the reversion to mystical vitalism which took place after the clear and successful research of the preceding century. As a fact, the parallel between the conditions of the eighteenth century and those of to-day is unmistakable. Now, as then, the physico-chemical method of explaining phenomena of life looks back on a brilliant, almost dazzling sequence of successes; now, as then, the tracing of vital processes to physical and chemical laws has reached a point at which, for many years, with the methods now at our command, no essential progress has been made, where, on the paths hitherto trodden, a boundary line is everywhere distinctly marked; and now, as then, on the horizon of science the ghost of a vital force looms up. It has already taken possession of the minds of serious thinkers in Germany, with the dire prospect of more extensive conquests; and in France, too, it would seem, science is slowly opening its door to this invasion of genuine mysticism.

To understand this phenomenon psychologically, and to acquaint ourselves with the means of staving off a general reaction into vitalism, it is desirable to examine more carefully the present state of physiology. A review of the productions which appear in our different physiological journals, which will best exhibit the present state and tendency of the science, furnishes an extremely remarkable spectacle. Leaving aside the science of physiological chemistry, which is independently developing with great success, we find, with the exception of a few good contributions to the physiology of the central nervous system, as a rule, only extremely special performances of very limited scope and import, wholly without significance for the greater problems of physiology, whether practi-

cal or theoretical, and exhibiting no connexion whatever with any well-defined general problem of physiology. In fact, what is called physiology is beginning here and there to degenerate into mere technical child's play. With every new number of our physiological magazines, the unprejudiced observer is gradually gaining the conviction that general problems of physiology no longer exist, but that inquirers, driven to desperation in the struggle for material, have no choice but to hunt up the old dry bones of science, on which they fall with the nervous rapacity of hungry dogs. And in the case of most of the productions, this impression is strengthened by the fact that the results, when once found, are wholly disproportionate to the tremendous expenditure of labor and time which it might be seen beforehand they would require. And yet all the time the great problems of physiology everywhere stare us in the face and seek solution. For, if we regard the problem of physiology as the investigation of the phenomena of life, we are certainly yet very far from the solution of even its most important and most general problems. We need not go to the extreme that Bunge does in his excellent text-book of physiological chemistry, of maintaining that the phenomena of our organism which we have explained mechanically are not genuine vital processes at all, no more than is "the motion of the leaves and branches of a tree shaken by a storm, or the motion of the pollen which the wind wafts from the male to the female poplar." But it is certainly no exaggeration to say that what the splendidly-conceived methods of the great masters of physiology since Johannes Müller have explained, are not elementary processes of life, but almost exclusively the crude physical and chemical actions of the human body.

For what have we attained? We have measured and registered the motions of respiration, the mechanics of the gaseous exchange in the lungs in their minutest details. We know the motions of the heart, the circulation of the blood in the vascular system, nay, even the slightest variations of the pressure of the blood, as produced by the most diverse causes, as accurately as we do the phenomena of hydrodynamics in physics. We know that respiration and the motion of the heart are conditioned by the automatic activity of ner-

vous centres in the brain. But no spirometer, no kymograph, no measuring or registering apparatus can give us the slightest idea of what takes place in the nerve-cells of the brain that condition the beating of the heart and respiration.

Further, we have investigated the motions of the muscles, their dependence on the most diverse factors, their mechanical powers, their production of heat and electricity, as exhaustively as only the phenomena of the special departments of mechanical physics have hitherto been treated. But of what goes forward in the minute muscle-cells during simple muscular contraction, no myograph, no galvanometer has as yet given us the slightest hint.

We know also the laws of the excitability of the nervous fibres, of the propagation of irritations, of the direction and velocity of nervous transmission, thanks to the ingenious methods of recent physiology, in all their details. But of what is enacted during these processes in the nerve-fibres and in the ganglion-cell from which it ramifies, no induction-apparatus or multiplicator can give us the least information.

We know besides, that the heat and electricity produced by the body, and the mechanical energy of muscular work, are the consequence of the transformation of the chemical energy which we have taken into our bodies with our food. But by means of what chemical processes the cells of the individual structures take part in these achievements, the most sensitive thermometer or calorimeter will not disclose, and no thermal pile or graphical apparatus will indicate.

We might give any number of examples of this kind but those adduced exhibit distinctly enough the point to be signalised. What we have hitherto attained is this: we have measured, weighed, described, and registered the gross mechanical actions of the human body, for the most part with a degree of precision that would excite the astonishment of the uninitiated; we have also acquired a considerable knowledge of the rough mechanical interactions of the individual organs of the body, the mode of operation, so to speak, of the machinery of organisms. But all that has been done, has been done only up to a certain point; and this point, at which we are

brought to a halt, is the *cell*. We have traced all phenomena of change in matter, form, and force back to the point where they disappear in the cell. But of what takes place in the muscle cell, the ganglion-cell, the lymph-cell, the gland-cell, the egg-cell, the sense-cell, and so forth, we have not the slightest conception. Moreover, we discover here, that even the minutest cell exhibits all the elementary phenomena of life; that it breathes and takes nourishment; that it grows and propagates itself; that it moves and reacts against stimuli. The *elementary* riddles of life, accordingly, have so far defied all research.

A balance thus cast of the results of past physiological research does not, it must be admitted, exhibit a very encouraging outlook.

But the resignation of physiology has been strengthened by another prominent factor. This is the attitude of physiological research to psychical phenomena. This attitude is at the present moment a varying one. On the one hand, we still find secretly cherished the vain hope of a chemical and physical explanation of psychical processes, that is to say, of a reduction of them to the motions of atoms, even though Du Bois-Reymond, in his famous address on "The Limits of Our Knowledge of Nature,"* characterised such an undertaking as utterly futile; while on the other hand we meet with an absolute resignation in the face of this question—an attitude which is simply a frank acceptation of the conclusion of Du Bois-Reymond's address. Owing to the authority of its author, the "Ignorabimus" of Du Bois-Reymond has influenced great numbers of inquirers and produced in physiology a real paralysis of research, so that the abandonment thus effected of the solution of the old problem of explaining psychical phenomena mechanically has caused physiology for the most part anxiously and reverently to avoid any intrusion whatever of psychological questions. On the one side, then, is the idle hope of solving a problem which despite its being as old as human thought itself, research has not yet even touched; and on the other, an absolute renunciation of any treatment of the problem whatsoever.

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* *Ueber die Grenzen des Naturerkennens. Reden. Erste Folge.* Leipsic. 1886.

THE NEW VITALISM.

Exactly as happened in the preceding century, we have again arrived, after a long period of the most successful conquests in science, at a point where a barrier is placed to the methods hitherto pursued, and at which research has for a long time stood still without overleaping it. Again, as in the preceding century, we have psychologically the same constellation, and already the first signs are beginning to show themselves of a tendency of science to seek a second time its salvation in a theory of vitalism. Already voices are multiplying which proclaim that the phenomena of life will never be fully explained, while a few decades ago the confidence of successfully investigating all vital processes was without exception a universal one. As a fact, the same vitalistic ideas have already been promulgated by eminent natural inquirers, as were set forth by the vitalists of the early period.

The botanist Hanstein* has given unequivocal utterance to such ideas. Starting from the fact that the organs of animals and plants show a definite conformation according to the species from which they are descended, Hanstein arrives at the conclusion that there is inherent in living organisms some special formative power (*Eigengestaltungskraft*), which has nothing whatever to do with the forces of inorganic nature. "As long as it is a correct principle of science," says Hanstein, "that there must be different causes where there are different effects, it cannot be legitimately maintained that the formative processes of organisms which are seen constantly to strive towards some predetermined end are nothing but the combined effects of forces inherent in atoms and active as rays or vibrations." In this "special formative power" of Hanstein we recognise at once, and in unmodified form, the *nisus formativus* of the vitalists. True, Hanstein admits that physical and chemical forces, such as act in lifeless bodies, also come into play by way of supplement to

* Hanstein. *Das Protoplasma als Träger der pflanzlichen und thierischen Lebensverrichtungen.* Heidelberg. 1880.

the special formative forces of living organisms, but *specific* phenomena of life he refers exclusively to special formative powers. Also he sees the activity of these forces in the phenomena of the heliotropism of plants, of the geotropism of the roots and trunks of trees, of the chemotropism of zoöspores, and generally in all phenomena of irritation, while the same force is also discerned by him in what the zoölogy of earlier times called instinct. Indeed it is a remarkable sign that Hanstein at this late day conceives instinct as a *force* in the same sense as physical forces are conceived, that is, as the cause of motions. Yet Hanstein regards this assumption not only as necessary but also as highly useful. "It must be maintained in the face of all objections, that this hypothesis is for the time being the simplest; that if it does not exactly explain the majority of the observed phenomena of life it yet puts them under a monistic (!) point of view; that it is not in contradiction with other phenomena, and does not make out of a small miracle a greater one, but while it solves (!) many riddles, reduces most others to a single simpler one." These are the words of a serious naturalist at the end of the nineteenth century! The same views on this point, though not so clearly expressed, are also maintained by the well-known botanist Kerner von Marilaun and the pathologist Rindfleisch. Indeed, from many quarters a frank and unmistakable demand is made for the recognition of a "neo-vitalism."

Quite different from this pronounced reaction towards mysticism is the vitalism which the physiologist Bunge professes. Bunge is a man of sound philosophical and critical ability; and if he openly sets himself up for a vitalist he produces by so doing a false impression, for his vitalism, if closely examined, will be found to be something quite different from the vitalism of the old school.

True, Bunge openly takes his stand on the ground of vitalism, when he says,* "If you assert in refutation of vitalism that there are no other factors active in living beings save the forces and materials of unanimated nature alone, I must dispute your assertion."

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* *Lehrbuch der physiologischen und pathologischen Chemie.* Second Edition. Leipsic. 1889.

Yet we shall observe if we follow Bunge a little further that his vitalism is purely a subjective idealism, which has sprung from the perception that it is reversing the true order of things to attempt to explain psychical processes by a mechanics of atoms. Bunge says: "The essence of vitalism consists simply in taking the only right course of knowledge, that is, in starting from the known, or the inner world, in attempting to explain the unknown, or outer world." We see thus that Bunge is on the right path by his so-called vitalism for avoiding the *one* cause of reaction towards the old mysticism—namely, the impossibility of resolving psychical processes by the physics and chemistry of matter. But unfortunately at this point Bunge comes to a halt. Instead of drawing from this perception that the whole physical world consists simply of compounds of sensations or of percepts, as its ultimate and unavoidable consequence a demand for a monistic conception of the world, Bunge still lingers in the old dualistic notion of a contrariety between a living and a lifeless, a dead and an ensouled nature, to which he gives expression in the above-cited words, and sees no other way out of the difficulty at present than to go on resignedly working away in the old mechanical direction, which by his own confession is a reversion of the true method.

THE MONISTIC POINT OF VIEW.

They who have fought their way through to a monistic point of view will have little difficulty in finding a complete and satisfactory solution of this dilemma. If the world of bodies consists solely of compounds of sensations, then the whole world is a unitary existence, for the supposed and otherwise irreconcilable contrariety of a physical world and a psychical world is dissipated. When, therefore, we investigate the physical world in a scientific or physical manner, we really investigate, in so doing, the laws according to which our percepts or notions of the physical world arrange themselves and combine to form higher compounds, that is, we are really pursuing a psychological inquiry. All natural science consists of such work, and the so-called "mechanical" method of research which has hitherto universally obtained, and by its great successes proved it-

self so wonderfully productive, is not only fraught with no danger for him who is conscious that mechanism is not a thing which is opposed to and exists beyond the soul, but even finds its full justification. From a monistic point of view, therefore, the mechanical method of inquiry is not only, as Bunge believes, a provisional expediency, but actually an absolute necessity.

But in this case the mechanical method of inquiry must also be able to explain the phenomena of living as well as of lifeless bodies; in both cases we have to deal with bodies, and for both, the laws of those complexes of sensations which we call bodies must possess validity. But it is altogether a different undertaking to attempt to explain by phenomena of the physical world simple sensations, which unlike our conceptions of bodies are not complexes. An endeavor of this kind, such as the materialists are constantly but vainly undertaking, is like the absurd attempt to divide the series of whole numbers by a number which is not numerical unity. In the one case as in the other, of course, the computation cannot be performed.

The main obstacle that has stood in the way of the establishment of monistic conceptions is the supposed contrariety of body and soul, an idea familiar to human thought since the earliest times. In fact, it would seem at first blush a wonderful thing that this ancient idea of the ensoulment of physical things could have maintained itself with such tenacity till so late a day. If the physical world is in reality only conception, it seems at first almost absurd to think of a conception as being ensouled. Yet no one doubts for a moment that other human beings are ensouled, and only a few, that animals are ensouled. It is worth while to look more closely into this paradox. When we do so, it will be found that exactly in a monistic point of view is the corroboration, nay, the necessity, of this interesting phenomenon to be found. The idea of the ensoulment of physical objects or bodies is the first beginning of a psychological analysis of our conceptions of bodies. By thinking of a body as ensouled, man makes the first step in the analysis of his own conception of that body.

A little reflexion will at once make this clear. We need only look somewhat closely at our conception of our own body. The his-

tory of the development of the soul, as Wundt* and Preyer† have followed it in the history of the development of the mind of man and especially of the child, shows us in outline how our conception of our own individual body has arisen. The formation of this apparently compact ego is an inductive process. The first beginnings are made unconsciously, by primitive sensations being brought into mutual connexion. These are the original, as yet unconscious, individual egos of the different parts of the body, which subsequently we consciously distinguish. But, owing to the fact that these individual egos, in the course of a rather long development, are gradually referred to the egos of individual sense-organs, particularly to that of the sense of sight, as to something constant, the single, unified conception of a whole bodily ego is slowly developed, which, by the constant acquisition of new elements gradually reaches higher and higher stages of consciousness; for what we call consciousness is a fact of enormous comprehension and intricacy, which we can reverse, so to speak, and by the gradual elimination of single component parts, such as takes place, for example, in partial and total hypnosis, dreams, narcosis, and so forth, actually analyse into unconscious sensations. While the conscious ego by the intussusception of new elements is thus constantly widening, the notion of the ego is slowly formed which every normal man possesses, and which subsequently also he constantly extends. These are, of course, only the first beginnings of our investigations in psychogenesis, and many essential elements of our knowledge in this domain are still wanting. But these facts are now quite settled, that the formation of our notion of our own body is nothing more or less than the outgrowth and combination of certain simple sensations, images, thoughts, judgments, and so forth, which constantly increase in complexity and ultimately yield a product of extremest intricacy, namely, our notion of our bodily ego, so simple to superficial inspection.

Here, in any event, we have a first equation: What appears to

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* Wundt, *Vorlesungen über Menschen- und Thierseele.* Leipsic, 1863.

† Preyer, *Die Seele des Kindes. Beobachtungen über die geistige Entwicklung in den ersten Lebensjahren.* Leipsic, 1881.

us as so compact and single an object as our body, is in reality an extremely complex synthesis of our own mind, the individual elements of which psychogenetic inquiry has only revealed with great difficulty, and that only to a very limited extent. But just as our notion of our own body is only a simple expression, a symbol, for an extremely complex psychical synthesis, such also are our notions of all other bodies, in the first instance of all other men, but then also of all animals and plants down to unicellular organisms, nay, even into the dark province of molecules and atoms which make up the lifeless bodies of nature. The formation of our notion of the world of bodies is nothing else than an extension of our own Psyche.

When, therefore, we picture to ourselves a body as ensouled in the same way that we conceive our own body ensouled, with these or those sensations or groups of sensations, in doing this we only analyse our apparently single and compact notion of the body, be it of a man or of an animal or what not, according to the standard of our present knowledge, into the simpler component elements out of which it has been psychogenetically constructed. Proceeding rigorously and logically from our first equation we obtain thus by conceiving bodies as ensouled a multitude of new equations, from many of which we can eliminate and isolate certain factors more easily and distinctly than from the first. But we have no right, if we are determined to be logical and consistent, to stop with the conception of ensoulment at man, as early times did, or at animals, as is now usually done, or, for that matter, at organisms at all: it is an inexorable consequence which, foreshadowed by ancient philosophers, has been more distinctly expressed in modern philosophy, and in natural science especially set forth and expounded with great lucidity by Haeckel, that *all* bodies must be regarded as ensouled, though ensouled it may be in different ways.

Thus from the monistic point of view the apparent dualism of the world of body and the world of soul finds its just appreciation. Monism alone disposes in a simple and satisfactory manner of the old, old problem of the relations of the body to the soul, of the material to the spiritual world,—a problem whose insolubility from the point of view of dualism again threatens to drive us into the arms

of vitalism. While at the same time monism also tears down the last barrier which Bunge is disposed to see between living and lifeless nature—namely, ensoulment.

CELLULAR PHYSIOLOGY.

If on the one hand we can justly cherish the hope that the increasing extension of the monistic world-view in natural science will ward off the dangers of a reaction to the old vitalism, the fact nevertheless remains that in treading the beaten paths we are making no progress whatever in physiology, and that we have stood still for years on the same spot and not approached a single step nearer our goal of explaining the elementary phenomena of life.

We have reached a turning-point in physiological research which could scarcely be made more prominent. The reappearance of vital force is a token of it. As before all great crises of history portentous spirits appear to clairvoyant people, so in our days the ghost of the old vital force has loomed up in the minds of some of our natural inquirers.

But striking and obvious as the fact is that we can no longer approach by the old paths of research an explanation of the elementary phenomena of life, still, it is exactly as obvious and striking in what direction there is the only chance or hope of our approaching our goal.

We have traced the vital processes of man in physiology back to the point where they are lost in the cell. Now, what is more reasonable than that we should seek them out in the cell? In the muscle-cell is hidden the riddle of muscle-movement, in the lymph-cell is hidden the causes of secretion, in the epithelial cell is buried the problem of resorption, and so on. The theory of the cell has long since disclosed that the cell is the elementary foundation-stone of the living body, the "elementary organism" itself, that in which the processes of life have their seat; anatomy and evolution, zoölogy and botany, have long since realised the significance of this fact, and the wonderful development of these sciences has furnished a brilliant proof of the fruitfulness of this branch of inquiry. Only in physiology was the simple, obvious, and logical consequence over-

looked, and until very recently not practically applied, that if physiology regards it at all as her task to inquire into the phenomena of life, she must seek these phenomena at the spot where they have their origin, at the focus of life-processes, in the *cell*. If physiology, therefore, is not simply content with confirming the knowledge which is already gained of the crude mechanical actions of the human body, but makes it its object to explain clearly elementary and general phenomena of life, it can accomplish this object only as cellular physiology.

It may appear paradoxical, that although nearly half a century has elapsed since Rudolf Virchow first enunciated in several classical works the cellular principle as the basis of all organic inquiry, a basis on which to-day, indeed, all our ideas in pathology are constructed, physiology still is only just beginning to develop out of a physiology of organs into a physiology of cells. Yet this is the true and normal course of development of science which always advances from the crude to the delicate. And it would, therefore, be impardonable ingratitude and a mistaking of the mode of development of human knowledge if we should seek in the least to underrate the high importance of the physiological research of the past epoch, on whose shoulders in fact we stand, and with whose results we more or less consciously continue our work. Further, in our judgment of the course of development of physiological research, a factor must not be overlooked which controls the development of every science, namely, the psychological factor of fashion. The development of every science depends on the stupendous influence of great discoveries. Wherever we cast our eye in the history of inquiry, we find that great discoveries such as, to take the case of physiology, are represented in the works of Ludwig, Claude Bernard, Du Bois-Reymond, and Liebig, deflect interest from other fields and induce a great multitude of inquirers to pursue research in the same direction with the same methods, especially when these methods have proved themselves so wonderfully fruitful as in the cases adduced. Thus, certain departments of inquiry become, in connexion with epoch-making performances, fashionable, and the interest of thinkers in others subsides. But an equalisation in the course of time is always

re-effected, for every field of inquiry, every method of inquiry is finite and exhausts itself in time. We have now reached just such a point in physiology: the physiology of organs is in its period of exhaustion. Also the method of cellular physiology will exhaust itself in the course of time, and its place will be taken by other methods which the present state of the problem do not yet require.

But for the present the future belongs to cellular physiology. There are, it is true, inquirers who, although they are convinced of the present necessity of a cellular physiology, and see perfectly well that the cell as the focus of the processes of life must now constitute the real object of research, yet doubt for technical reasons whether it is possible to get at the riddles of life as they exist in the cell. It may, therefore, be justly demanded that some way, some methods be shown with which a cellular physiology can be founded. The doubt of the feasibility of this undertaking is in great part the outcome of a phenomenon, which, unfortunately we must say, has characterised physiology ever since the death of Johannes Müller, namely, the total lack of a comparative physiology. Physiology has not yet entered on this rich inheritance of the great master. How many among the physiologists of the day are acquainted with other objects of experiment than the dog, the rabbit, the guinea-pig, the frog, and a few other higher animals! To how many are the numerous and beautiful objects of experiment known which the wonderful luxuriance of the lower animal world offers! And yet just among these objects are to be found the forms which are best adapted to a cellular-physiological solution of physiological problems.

Naturally, if we believe we are limited, in our cellular-physiological treatment of the riddles of motion, digestion, and resorption, solely to man and the higher animals, we shall encounter in our investigation of the living muscle-cell, lymph-cell, epithelial cell, and so forth, more or less insuperable technical difficulties. And yet the splendid researches of Heidenhain on secretion, digestion, lymph-formation, and so forth, have shown what good results the cellular-physiological method can achieve even here. Well-planned histological experiments, such as those which put the liv-

ing cell in its intact connexion with the remaining woof of the body under given conditions, and then investigate the results in the suddenly slaughtered animal, to get from such experiments light on the processes peculiar to the condition of life, undoubtedly furnish the germ of much valuable knowledge. But it is of the very nature of these experiments that they must always remain difficult and restricted, for the *living* object, the tissue-cell, is accessible to microscopic investigation only with the greatest difficulty. Comparatively small difficulties in this respect are offered only by the free-living cells of the organism, as, for example, by the leucocytes or blood-corpuscles. And as a fact, by the researches of Metschnikoff, Massart, Buchner, Gabritchevsky, and many others, we have recently acquired some important and wide-reaching experimental knowledge concerning the vital phenomena of these very objects.

But if we place ourselves at the point of view of comparative physiology which Johannes Müller represented throughout his whole life with such success and energy, an infinitely broad perspective opens itself up for cellular investigations. A comparative view shows one fact of fundamental importance, namely, that elementary life-phenomena are inherent in every cell, whether it be a cell from the tissues of higher animals or from the tissues of lower animals, whether it be a cell of a plant, or, lastly, a free cell, an independent unicellular organism. Every one of these cells shows the general phenomena of life, as they lie at the basis of all life, in their individual form. With this knowledge, all that it is necessary for the inquirer to do is to select for every special object of experiment the fittest objects from the wealth of forms presented, and with a little knowledge of the animal and plant world, such forms really obtrude themselves on the attention of the experimenter. Accordingly, it is no longer necessary to cleave so timorously to the tissue-cells of the higher vertebrate animals, which, while alive and in normal environment, we can only use for microscopic experiments in the rarest and most exceptional cases; which further, the moment they are isolated from their tissues, are no longer in normal conditions and quickly die or give reactions that may easily lead to wrong conclusions and to errors. Much more favorable are the tissue-cells of

many invertebrate, cold-blooded animals or plants which can be more easily investigated in approximately normal conditions of life; yet even these, as a rule, will not outlast protracted experiments. But here appear as the fittest imaginable objects, for cellular-physiological purposes, free-living unicellular organisms—namely, protists. They seem to be created by nature expressly for the physiologist, for they possess, besides great powers of resistance, the incalculable advantage of existing in a limitless variety of form, and of exhibiting, as the lowest organisms that exist, all phenomena of life in their simplest conditions, such as are not to be found among cells which are united to form tissues, on account of their one-sided adaptation to the common life of the cellular colony.

Concerning the application of experimental physiological methods to the cell, we need be in no perplexity as to which we shall choose. In the luxuriant multiplicity of form which this world presents, there can always be found for every purpose a great number of suitable objects to which the most different special methods can be capitally applied.

We can, to begin with the simplest method, apply in the easiest manner imaginable to the free-living cell the method of simple microscopic observation of vital processes. In this manner mere observation has furnished us knowledge of the individual life-phenomena of cells in many details and also of their mutual connexion. Among the most recent achievements of this simple method may be mentioned only the extremely valuable knowledge concerning the more delicate and extremely minute circumstances of fecundation and propagation which Flemming, Van Beneden, the Hertwigs, Strasburger, Boveri, and many others have gained in recent years, partly from living cells and partly from cells fixed in definite conditions of life.

Moreover, we can also conduct under the microscope vivisectional operations on unicellular organisms in exactly the same scope and with greater methodical precision than can be done on the higher animals. Several inquirers, as Gruber, Balbiani, and Hofer, have already trodden this path with great success, and a considerable group of researches has shown distinctly enough the fruitful-

ness which this cellular vivisectional method of operation promises for the treatment of general physiological problems. With this vivisectional method also Roux, the Hertwigs, and others conducted their splendid investigations on the "mechanics of animal evolution," by showing what functions in the development of animals fall to the lot of the different parts of the egg-cell or to the first filial cells that proceed from their division.

We can also apply here, in its whole extent, that powerful physiological method known as the method of irritation, and investigate the effects of different kinds of irritation on the life-phenomena of the cell or of different cell-forms. The vegetable physiologists have already collected a great mass of material in this field. But also in the department of animal physiology a great number of recent works have endeavored to prove that the phenomenon of irritation which takes place on the application of chemical, mechanical, thermal, galvanic, and luminous stimuli to unicellular organisms are of the greatest importance for the phenomena of life generally.

Finally, we can approach the life-phenomena of the cell chemically, although in this direction only the very first beginnings have been made, seeing that the microchemical methods have been hitherto little developed. Nevertheless, the labors of Miescher, Kossel, Altmann, Zacharias, Löwitt, and others have already shown that the microchemical investigation of the cell has a future of great promise.

In the meantime, it is a gratuitous task to enumerate the individual methods that are capable of application in the domain of physiology. All methods may be used which the special experimental object of the moment requires.

Ever and anon in physiology must we revert to the point of view which formerly so fruitfully shaped the research of our great master, Johannes Müller. Johannes Müller, during his whole life, practically and theoretically represented the view that there is no one physiological method, but that every method is admissible which leads to the goal. He always chose his method to fit his problem and never, as is now so often done, the problem to fit his method. Not the method, but the *problem* of physiology is single

and unique. In the solution of this problem physiology employs chemical and physical, anatomical and developmental, zoölogical and botanical, mathematical and philosophical methods of inquiry, according to what the special object in view requires. But all methods shall lead to one goal only, the solution of the question, What is Life?

MAX VERWORN.

JENA.

KANT'S DOCTRINE OF THE SCHEMATA.

WITH ONE accord the exegetists find in this subject of the "Kritik" no positive contribution to our knowledge. Professor Green (Vol. II, p. 39) says:

"And since the categories themselves are nothing else than the forms of this unity, as so exercised, nothing is needed to mediate between them and the objects. The 'Transcendental Analytic' would have been much simpler if the account of the categories prior to the 'Deduction' had been omitted. The categories then would have appeared in that separate form in which they are made to correspond to the classification of logical judgments (a classification which is only of value in relation to the syllogism, and which represents as little as the syllogism the process by which intelligent experience is formed). We should have had (1) what is fancifully called the 'Deduction of the Categories,' exhibiting the unity of apperception, derived from the presence of the 'transcendental ego' to all feelings, as the condition of the possibility of all experience, and then (2) without surplusage of distinction between 'categories' and 'schemata,' an account of the principles of pure understanding (as given in the third section of the 'System of Principles'), i. e.. of 'the general rules of unity in the synthesis of phenomena,' as arising out of the application of the thinking unit to the 'manifold of sense,' and thus involving 'determination of time.'"

I understand Professor Green to say that the schema is unnecessary and that it is unnecessary because the category and the object to which the category is applied have a common source in the transcendental unity. Since the object and the category are alike forms of the unity of consciousness, the category does not need any schema in order to apply to the object. Hence he speaks of the division into categories and schemata as a "surplusage of distinction."

Prof. Edward Caird says (Vol. I, p. 435, "The Critical Philosophy of Kant"):

"It is important here to observe that the schematism is made necessary simply and solely by Kant's view of self-consciousness."

Again (p. 437):

"If we thus work out the idea of the universal and the particular, of conception and perception, in the judgment, we see that Kant's mediation of each moment by the others must necessarily reduce them to relative elements which exist only in this unity. The reciprocity of determination between the two terms, which is thus disclosed, reduces their difference into a difference of correlative elements; and at the same time, it makes unnecessary the interposition of any middle term to connect them."

Again (p. 439):

"We can, indeed, vindicate Kant to some extent by referring to what he elsewhere says, to the effect (1) that the synthesis of imagination, by which perception is brought about, is conformable to the categories, and (2) that the consciousness of self in inner experience is possible only in relation to outer experience. But when we make the correction necessitated by these two admissions, there is no longer any need to schematise the conception, with reference to its use as a predicate for perceptions given independently."

I understand Professor Caird to teach that the schemata are unnecessary and to go to the point of vindicating Kant for this confusion into which he fell. Dr. Adickes in his edition of the "Kritik" (p. 171, note) says:

"Das dunkelste Stück der 'Kritik' haben wir hier vor uns, von Manchen deshalb für das tiefsinnigste gehalten. Verschiedenartige Lösungen des Räthsels sind versucht, oft äusserst verwickelte. Ich biete eine neue, sehr einfache, die freilich den Kantgläubigen sehr gewagt, wenn nicht sogar gottlos oder frivol dünken wird. Nach meiner Ansicht ist dem Abschnitt über den Schematismus gar kein wissenschaftlicher Werth beizumessen, da er nur aus systematischen Gründen später in den 'kurzen Abriss' eingefügt ist."

Dr. Adickes thinks there is no difficulty to be met. The categories are at work upon the objects and do not need any *tertium quid* to mediate. In the second place, if there were any such difficulty, it would be insurmountable. Kant creates the difficulty by following formal logic.

We have given the interpretations of three leading students of

Kant. They insist that Kant's doctrine of the schemata is not an addition to the thought-movement of the "Kritik." While the weight of this authority is alarming to any student, it is evident that the probabilities are against them. A great thinker does not err in his doctrine. He may fool himself, even as a child would, in setting forth the ultimate significance of his doctrine; but the doctrine itself cannot be vain. It is the expression of a thought-movement. It is like the arm of a man's body. The only possible mistake is one of use.

What is Kant's doctrine of the schemata? It is a section in the analysis of the third subject in the "Kritik." First comes the Æsthetic, occupied with a study of space and time. Then comes the Deduction of the Categories. Then comes a deduction of the judging-power (*Urtheilskraft*). The judging-power Kant considers from two points of view. First, there are conditions in the subject. Second, there are conditions in the object. That is, in order to put a category to work, there are necessary these conditions. The conditions in the subject are called schemata; the conditions in the object are called principles (*Grundsätze*). I understand Kant to consider in the section called, *Von dem Schematismus der reinen Verstandesbegriffe*, the conditions of the judging process, viewed subjectively; and in the section, *System aller Grundsätze des reinen Verstandes*, the conditions of the judging process, viewed objectively. These two considerations form the doctrine which he calls, *Von der transcendentalen Urtheilskraft überhaupt*. We are concerned with the first section, his doctrine of the schemata, that is, his doctrine of the subjective conditions of the judging process. Let us reproduce his analysis.

In the introduction (p. 168, Adickes's edition), Kant distinguishes between the *Verstand* and the *Urtheilskraft*. The *Verstand* is the legislating activity—laying down rules; the *Urtheilskraft* is the administrating activity—bringing an object under a rule. The first activity has been analysed in the Deduction. We are now occupied with the *Urtheilskraft*. This consideration belongs entirely to transcendental logic. It is a study of the power of judging, not of the form of anything,—hence formal logic has nothing to say here.

This transcendental doctrine of the power to judge falls into two divisions. I give Kant's words (p. 170):

"Das erste, welches von der sinnlichen Bedingung handelt, unter welcher reine Verstandesbegriffe allein gebraucht werden können, d. i. von dem Schematismus des reinen Verstandes; das zweite aber von denen synthetischen Urtheilen, welche aus reinen Verstandesbegriffen unter diesen Bedingungen *a priori* herfliessen, und allen übrigen Erkenntnissen *a priori* zum Grunde liegen, d. i. von den Grundsätzen des reinen Verstandes."

I understand that the first considers the judging power as it is in the subject; the second, the judging power as it is in the object. Kant proceeds with his doctrine (p. 171):

"1. Whenever an object is brought under a concept, the representation of the object must be like-in-kind (*gleichartig*) to the concept—that is, the concept must contain that which is represented in the object.

"2. The pure concept of the understanding is not like-in-kind to the empirical intuition, and can never be met in it.

"3. How, then, can the empirical intuition be subsumed under the pure concept? This is the problem to be solved.

"4. The meeting-ground must be that which is like-in-kind to the intuition and the concept.

"5. This mediator—on the one hand, like-in-kind to the concept, on the other, to the intuition—is the transcendental Schema.

"6. Time is a Schema. It is like-in-kind to the concept in two respects,—it is universal and rests upon a rule. It is like-in-kind to the phenomenon in so far as it is contained in every empirical representation of the manifold.

"7. The necessity for the Schema cannot be escaped by supposing the categories to apply to thought-objects, or to things-in-themselves. The category must apply to the object given in intuition. In the pure concepts there are, in addition to the categorising activity, form-conditions of the intuiting activity. And in these form-conditions are contained the conditions that let the category work in the object. This condition of a category is the Schema of this category.

"8. The Schema is a product of the power to synthetise into forms. It is to be distinguished from the image. The image (*Bild*) is the form for objects; the Schema is the form for concepts.

"9. The Schema is the condition of the image. The word 'dog,' and the words, 'my dog, Jack,' stand for different processes. The one is general, the other particular. The power in the general process regulates the power in the particular process. The Schema is a transcendental product of the power to synthetise into forms; the image is an empirical product. The relation of a Schema to an image is much as the relation of a category to an object."

Here the doctrine ends and then follows a description of the schemata as related to the categories.

"*a*. Quantity.

"The pure Schema of all quantities is number.

"*b*. Reality.

"Reality is the quantity of something as filling time. It is the finished synthesis. The Schema of this finished synthesis is the synthetising activity.

"*c*. Substance.

"The Schema of substance is permanence.

"*d*. Causation.

"The Schema of causation is law. [This seems what Kant wished to say.]

"*e*. Reciprocal Interaction.

"The Schema of the reciprocal interaction of two substances manifest in their accidents is that the determination of the accident be at the same time and according to a law.

"*f*. Possibility.

"The Schema of that which is possible is that the synthesis of different representations must accord with the time-conditions. [Does he not mean that the Schema of the possible is the principle of contradiction ?]

"*g*. Actuality (*Wirklichkeit*).

"The Schema of the actual is existence in a definite time.

"*h*. Necessity.

"The Schema of necessity is the existence of an object continuously."

Kant interprets his doctrine in the following way. The Schema of the category, Quantity, is the synthesis of time itself in the succession apprehending an object. The Schema of the category, Quality, is the synthesis of the sensation with the representation of time. The Schema of the category, Relation, is the continuous chain of perceptions according to a time-rule. The Schema of the category, Modality, is time itself. The Schemata are thus *a priori* time-determinations according to a rule. They follow the categories and relate to the time-series, the time-content, the time-order, and the time-totality. From this it is clear that the schematism of the understanding, through the transcendental synthesis of the imagining power, is no more than the unity of all the manifold of intuition in the inner sense. It comes thus indirectly to the apperceiving unity.

I wish to consider the question of the schemata from two points

of view. First, Is there any such reality in the world of the mental process as Kant indicates? Second, Is his doctrine an adequate analysis of this reality?

In the first place, Is there any part of the mental process we may call a Schema? Professor Green says, No. The doctrine is a "surplusage of distinction."

> "The peculiarity in Kant's view of the 'schemata,' as a *tertium quid* between the categories and sensible intuitions, arises from the separation which he makes between these as constituting severally the form and the matter of knowledge.' (Vol. II, p. 35.)

This sentence explains the peculiarity in Professor Green's interpretation. The schema is not the kind of *tertium quid* that Professor Green imagines. The effort of Professor Green is to show that the category takes hold of the material immediately. This is Kant's doctrine also. The schema is not a bridge; it is a third party that brings two other people together. The marriage of the two people may have been planned from the foundation of the world, but it was also planned that a third person should bring them together. Kant will admit the contention of Professor Green and still set forth his doctrine of the schematism.

What is a Schema?

How shall we explain the fact that Professor Green misses the doctrine of Kant? It is due to his point of view. Why should a point of view play such havoc? What is it? a category? an intuition? Do we not rather understand by it the way in which categories are applied to facts? We ask a man to be careful of his view-point. He does not change his categories. He does not get a new set of facts. It is the view-point that explains the new conclusion. I know of no surer way to the discovery of the reality Kant saw in his schema, than an attempt to explain the power of the view-point.

We are told that Saul started from Jerusalem to Damascus upon a definite mission. He reached Damascus and did a work the exact opposite of that he intended. This change is explained in terms of an experience along the way. The change was so profound that the man took a new name, Paul. The facts did not change. The categories did not change. We say his way of looking at facts

changed. That is, there was a new condition for the application of the categories. This new condition stands above the fact and the category, and determines the application. We say it is an experience that determines a man's theology. There are types of experience. And a type of experience is a schema.

Professor Newton and a wild pagan stand on a hill and see the eclipse of the sun. To the pagan the event is the beginning of a series of horrible calamities to himself and his tribe; to Professor Newton the event brings the most longed-for experience of the year. Are we to explain the difference in terms of a change of facts, or of categories. It will not do to say that one uses the category of causation. Causation is not a category, unless both men use it. The difference can be explained only by a series of schemata. Again, nature to Aristotle is not the nature that Helmholtz knows. Aristotle could see no truth in the atomistic view of things. The doctrine of atoms was to him unnecessary and contradictory. Why was there no place for an atom in the thought of Aristotle? Aristotle had no place for change. It was nothing real. It was simply an incident in the transition from the possible to the actual. When we see these two facts, we may understand why it was that physics, as a science, was impossible until thought had cast the forms of Aristotle; but this is after all an explanation of nothing. This break from the control of Aristotle, Lasswitz has called "der grösste Kampf, der auf dem Gebiete der Erkenntniss ausgefochten wurde, welcher im 17. Jahrhundert die aristotelische Physik stürzte." ("Geschichte der Atomistik," p. 85.)

What were the weapons in this royal battle of the seventeenth century? They were neither facts nor categories. The question was, how to apply categories to facts. And the victory was the victory of one way of categorising the facts. It was a battle between the schemata,—causality and substantiality. Lasswitz in his great work, "Geschichte der Atomistik," p. 78, says:

"Die Entwickelung der Physik als selbständiger Wissenschaft ist der Kampf gegen den aristotelischen Begriff vom Körper, die Emancipation von der Theorie der substanziellen Formen. Aber wissenschaftliche Begriffe werden nicht plötzlich durch die That des Genius geschaffen; sie entstehen durch allmähliche Um-

bildung der vorhandenen Erkenntnissmittel, durch Bewusstwerden bisher der Menschheit verborgener Denkmittel."

Again, p. 44:

"Das Denkmittel der Substantialität beherrscht die gesammte Metaphysik, insoweit sie vom Gedankenkreise Platons abhängig ist; das Denkmittel der Causalität hat in der modernen Wissenschaft seine Triumphe gefeiert."

The power of Aristotle was the power of the schema, Substantiality. The substitution of causality, as a schema, for substantiality, was the condition of the birth of physics.

Examples like this one, in which a revolution is made, can be multiplied. Lasswitz explains these revolutions as above pointed out. One *Denkmittel* is substituted for another. In the study of nature he finds the *Denkmitteln*, *Substantialität*, *Causalität*, *Variabilität*. These *Denkmitteln* of Lasswitz I call schema. And a revolution in any science, for example, the transition from alchemy to chemistry, is at bottom the substitution of one schema for another. If still further evidence is needed to prove that there is such a reality as Kant is analysing, let the reader consider this set of facts. History tells us that human life grows by becoming more complex. At one time it is simple. One fact occupies its interest; the fact of the absolute. Then the fact of law is seen. Conduct becomes moral, and nature is orderly. Men are united and held firmly together by a creed. Then a state or a church holds them. Nature is first orderly, then mathematical, then chemical, then geological. Human life is static, corrupt, progressive. Let these great facts be explained.

Let the reader reflect upon these transitions until he gets the cause of them. Human life is moral, this moral life is religious, this religious moral life is first institutional, then individual. We see in nature caprice; then we see mathematics everywhere. Is mathematics, as a method of seeing things, to be explained in terms of the categories? Is the transition from the mathematical to the dynamical way of seeing things to be explained in terms of the facts, or the categories? It seems, then, that consciousness in its movement into the complex, at every point of its enlargement, manifests a reality not considered in the analysis of Professor Green. It is

not a fact, it is not a category, it is that which determines the way we see things—the manner in which the facts are categorised. It is called a view-point. It is called an experience. It is called religion. It is also called materialism. The name is legion; the reality is something that makes us see things in a given way. It is infallible, but it is not universal. The only deliverance is to substitute a like ruler.

Our second point is to ask if Kant's doctrine is adequate to the reality. There is a schema. Is Kant's analysis of it satisfactory? What is a schema? It is that which renders possible the application of a category to a phenomenon. Does the category need any such mediator? Professor Green says, No. In a general way, we have shown that there is such a reality; but let us see it work in a mental process. The schema of substance, says Kant, is permanence. What does this mean?

Substance, says Aristotle, is "whatever may be the cause of being,"—"'the what' a certain thing is, on the removal of which the whole is taken away" ("Metaphysik," Bk. IV, Ch. 8). Substance for the atomist is that which remains after the last possible division. (See "Lasswitz," p. 68.)

Substance in the human life is that which persists forever. Substance in the universal sense is that source of all things—absolutely self-contained—in which there is not even "the shadow of a turning." Now I understand Kant to say that the condition of such a proposition is the schema, permanence. That is, permanence is that without which substance cannot be thought. Substance is, so to say, a definite permanence. But what is permanence? Is it anything else than a concept? Yes, a vast deal else. It is a reality seen for the first time by the Hindu. It was Brahma. It was the schema of the ascetic life. It was one of the schemata of the Buddhist doctrine of Karma. It was one of the schemata of law in nature. It is also a power in the doctrine of institutions. The schema is the seed that introduces the tree into the earth. This is a condition of life. The mind declines to affirm that substance changes. It is the power of the schema. Its only means of release is to substitute evolution for permanence. This I understand to be the point of Kant.

But does Kant appreciate the reality he saw? He begins by saying that time is a schema. Then comes a caution. He next re-reminds us that a schema is not an image. Then he will deliver us from the dry and tedious analysis which the doctrine demands,—and will give a list of schemata, following the table of the categories. His conclusion is that:

"Die Schemata sind daher nichts als Zeitbestimmungen *a priori* nach Regeln, und diese gehen nach der Ordnung der Kategorien, auf die Zeitreihe, den Zeitinhalt, die Zeitordnung, endlich den Zeitinbegriff in Ansehung aller möglichen Gegenstände."

I see nothing in this conclusion at all adequate to the wealth of meaning in the schemata. Kant could not see Fichte and Hegel and Schopenhauer in himself. He insisted that they were not there. History has overruled him. Kant did not have the history of thought before him—and hence he could not give his "dry and tedious analysis that the doctrine of the schemata demanded." The time had not come for an *Entwickelungsgeschichte* of the special sciences. Hence Kant could not see the power of the schema. But he saw the reality. He seized the fact; he lacked the schemata for an appreciation of his discovery. He did not develop his mine. And this is our last word.

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THE EXEMPTION OF WOMEN FROM LABOR.

THE very original and somewhat startling plea of M. G. Ferrero in the January *Monist*, for the complete exemption of women from bread-winning labor is worthy of the author's chivalrous nature, and demands thoughtful consideration. One naturally feels impelled to accept his view, but such a crowd of practical objections at once arise that it becomes impossible to do so except in a very restricted sense. If he only means that women who actually bear children should be relieved from laborious physical activities during their productive period, nobody certainly ought to dissent, and it is to be hoped that the world has already got a long distance on the road toward such a result. But if he means that one-half of the human race should be and remain, from the standpoint of economics, non-producers, except in so far as the rearing of children is to be considered productive, the position cannot be maintained without important qualification.

So far as can be discovered from the article, its author proceeds upon the popular but erroneous assumption that every adult female in society is provided with a husband who is both able and willing to supply all her needs. To show how false this assumption is, let us glance for a moment at the conjugal statistics of the United States, which have been compiled for the first time in the history of the country for the census of 1890, but not yet published.* These statistics show that at that date the number of female persons of all

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*I am indebted for these figures to Mr. Henry Gannett of the Census Office, and to the Hon. Carroll D. Wright, Superintendent of Census, for permission to use them in advance of official publication.

ages in the United States was 30,554,370, of whom 17,183,988, or 56·24 per cent., were single. The important fact for our present purpose is the number or percentage of marriageable women who are in fact not married. It is found that about ten per cent. marry before the age of twenty, and a very few before the age of fifteen. As the statistics are compiled in five-year periods, it is impossible to obtain figures for any age between fifteen and twenty, although proper marriageability begins at about seventeen or eighteen. If we take twenty as the basis, it appears that there were 16,293,326 female persons of twenty years of age and upward of whom 3,228,-338 were unmarried, which is nearly 20 per cent. If we take fifteen as the basis, the number of that age and upwards was 19,602,178, of whom 6,233,207 were unmarried, or nearly 32 per cent. The true mean is somewhere between these and may perhaps be safely put at 25 per cent. The unmarried are made up of maids, widows, and divorced persons, the last of which classes is so small that it need scarcely be considered for the present purpose. Omitting the actual numbers and using percentages only, the returns show that between the ages of twenty and twenty-five about 53 per cent. were without husbands, between twenty-five and thirty about 28 per cent., between thirty and forty-five about 20 per cent. After this the number of widows increases so rapidly that from forty-five to fifty-five the unmarried amount to 26 per cent., and of women over sixty-five years of age only a little over 35 per cent. have husbands. Nearly six per cent. of all women never marry; about ten per cent. of those between the ages of thirty-five and forty-five had not yet married, and more than one-fourth of those between the ages of twenty-five and thirty were still unmarried. Further details are unnecessary, enough having been said to show how large a proportion of marriageable women are for one cause or another without that male protection and support that M. Ferrero's argument assumes.

Many of these unattached women are doubtless cared for in varying degrees by other male relatives, but it is clear that this ought not to be, since the men, on his theory, should have wives and families of their own. Ignoring, for the sake of the argument, the large number of cases in which the husband proves incompetent

to support his family, and admitting that the 75 per cent. who have husbands are adequately provided with occupation in rearing their children, or, if childless, as a large proportion always are, in merely attending to the wants of their husbands, what shall be said of the 25 per cent. who have no husbands and are therefore deprived of this occupation? A considerable number of the younger widows, it is true, have families on their hands, but these soon grow up and no longer require their attention. But if the wife is incapable of any form of productive labor, when she becomes a widow, and the support of her family devolves upon her alone, she is in an unfortunate position. Something more must be done than merely to nurse and protect her children. They must be fed, clothed, and housed.

M. Ferrero quotes, and quotes correctly, the economic law, or "paradox,"* as I have called it, that female labor "tends to lower the marketable value of male labor." It has been proved that a man and his wife working in a factory only earn the same that the man would earn working alone. This gives rise to one of those economic fallacies which it is found so hard to dislodge. It is akin to the fallacy that machinery should be discouraged because it throws the laborer out of employment. It overlooks the broader truth that two laborers must produce more than one. It proceeds from the pessimistic point of view that economic conditions must always be such that some one besides the laborer will take all the product except just enough to keep him alive. I am far from advocating the increase of female factory labor, but such labor with prompt and certain wages is often preferred by women to the ceaseless toil of farm and dairy life, with the uncertainty of crops and markets. The whole economic argument of Ferrero applies as well to men as to women. The real need is a great reduction in both the amount and the irksomeness of all labor, a greater resort to natural forces through invention and labor-saving machinery, accompanied, as it will be if the embargo upon distribution can ever be removed, by a greatly increased production, so that both sexes may perform

* *The Psychic Factors of Civilisation*, p. 279.

only agreeable labor, may enjoy ample leisure, and at the same time may possess most of those material blessings which are requisite to the highest physical and spiritual well-being.

It could be successfully contended that a certain amount of productive labor, or, at least, of both physical and mental activity associated with the satisfaction of natural wants, is necessary, not only to health, but also to happiness, and this quite irrespective of sex. It might also be satisfactorily proved that in the present state of society, for all except the very poor, it would be better to equalise to some extent the nature of the activities of the two sexes, rather than still farther to divorce them. While there is no doubt that the sterner sex should perform the sterner duties, the prevailing notion that woman is made to remain forever indoors and inactive is, to say the least, extremely irrational and unhygienic.

Finally, what shall be said of the large and constantly increasing class of productive businesses which only involve manual exertion to a limited extent and largely consist in the exercise of various mental aptitudes? Take teaching as an example. Shall women be excluded from such fields? Shall society lose the benefits which the peculiarities of the female mind enable women to confer in many of these employments, where men are less efficient? No doubt there should be a considerable readjustment of the duties of the two sexes, and this seems to be in process of accomplishment in the natural course of things. The division of labor of which M. Ferrero speaks must go much farther than he intimates. He would confine it to one class of female labor, that of rearing families and gracing homes. While, so long as nature remains what it is, the majority of women will continue to perform that chief function, there is and always will be a minority more or less large and respectable who must perform other functions to which the sex shall prove itself adapted. And the question will even arise whether the domestic function is always to be considered sufficient to fill the whole life of woman. Wives and mothers are often endowed not only with aspirations beyond it but with powers and talents that demand an opportunity for their exercise. Such cases are destined to multiply with the upward tendency of society. Indeed, a division of labor is beginning to be

called for just here. It is found that without diminishing the efficiency of the domestic function or detracting from the emotional side of maternal life, much of the arduous part of home duty can be delegated by intelligent mothers to those who can do nothing higher, thus relieving the former from harassing occupations which lower rather than elevate their nature, and enabling them to attend to a nobler class of duties, such as education, charity work, social accomplishment, self-culture, or even authorship.

M. Ferrero does not say whether he would educate women or whether, like Rousseau, he would leave them to grow up under the influence of nature, but as education involves work on the part of the learner as well as of the teacher, it is to be inferred that he favors the latter *régime*. He speaks of beauty and grace as the chief charms of the sex, and hence the principal ends to be secured by exemption from work. He seems to refer to mere physical beauty and to ignore that higher beauty which beams from the intelligent eye and makes one quite forget that it may be set in a plain face. While it cannot be denied, as he points out, that ease and freedom from care produce symmetry and conserve beauty and grace, there will nevertheless always be plain women, and unless these possess something besides their "looks" to recommend them their chances of securing partners in life will be small. Moreover, that form of beauty which is purely physical is of short duration. It fades early, and the comeliest girl becomes a plain woman, or, when old, it may be, altogether ugly. But that form of beauty which is based on intelligence not only does not fade, but even increases with maturity. The first wrinkles only serve to give it strength, and it is at its highest when the radiant countenance shines forth under silvery hairs. The female child of nature is a wax doll, pretty to play with for a time and then put aside. The enlightened woman becomes the equal and companion of man, of whose society he can never tire. As man rises in the intellectual scale he demands more and more this substantial companionship of a wife. There will be a few cases, as our author states in a previous article,* "of a *savant* marrying a

* *The Monist* for January, 1893, p. 232.

stupid, unintelligent wife," but these will grow rarer, and unless something is done to even up the sexes on the score of attainment, the number of unmarried is likely to increase. It was strongly maintained for a time that there was an antagonism between mental and physical development in women, and serious opposition was raised to giving girls a higher education, but at length statistics were appealed to and the objection was found to be a purely theoretical one.*

The article of M. Ferrero would have interested me very little had he not professed to support his views with quite an array of facts from biology, which is the standpoint from which I have been in the habit of looking at such questions. Nothing is clearer than that man should be primarily studied as an animal, and every attempt to treat anthropological questions from a biological standpoint should be encouraged. But unfortunately thus far nearly every such attempt has resulted in a complete failure to make the proper application of the facts which biology furnishes. The fundamental fallacy, which I have written an entire volume to point out, is that of ignoring the psychic factor in man, i. e., of treating man *only* as an animal. Ferrero has not escaped this fallacy, and his undisciplined race of idle women would be little else than so many half-tamed animals let loose in society. But there are other fallacies which he, in common with most others who have approached the subject from that side, has been led into. The most important of these is his failure to understand the full meaning of sexual selection and the consequent sexual history of the animal kingdom. I have on several former occasions† endeavored to set forth this history in its broader outlines, and I need not re-elaborate it here. It will be

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* "Health Statistics of Female College Graduates," being Part V (pp. 471–532) of the *Sixteenth Annual Report of the Bureau of Statistics of Labor of Massachusetts*, August, 1885, by Carroll D. Wright, Chief of Bureau, Boston, 1885. I am indebted to the Hon. Carroll D. Wright, U. S. Commissioner of Labor and Superintendent of Census, for kindly calling my attention to this important report and placing the volume in my hands.

† *The Forum*, Vol. VI, New York, November, 1888, pp. 266–275; *Proceedings of the Biological Society of Washington*, Vol: V, Washington, 1890, pp. 40, 41*; *The Psychic Factors of Civilisation*, Boston, 1893, pp. 86–89.

more profitable to consider certain of Ferrero's illustrations in the light of it. He maintains that throughout the higher forms of animal life there is a division of labor between the sexes whereby the male assists in the maintenance of the female, and argues that this is the secret of the greater longevity of such animals, while the often brief existence of lower forms is due to the lack of such a division of labor. He shows that in some birds there is a form of marriage and true co-operation of the sexes, and says that "the lion and the hyena, during mating-time, hunt only to provide food for the female, who remains passive," and that "in the monogamic and polygamic families of monkeys it is always the male or chief who guides the troop, who watches for the enemy, who opens the march, who advances courageously upon the adversary that threatens his family, while the female climbs the trees." It would be strange if a few such cases did not exist where the very survival of the species depends upon the development of this instinct, but, as a matter of fact, they are rare even among the higher types. In the great majority of cases the female, in addition to her maternal sacrifices, not only provides for the nourishment of herself and offspring but also fights in their defence, while the male remains passive except when he is fighting his rivals for her attentions. I doubt the statement respecting the lion, for lion hunters learn by experience that the male is little to be feared, and even assert that he is a coward, while they equally learn to beware of the lioness, especially when her whelps are with her. Even Tartarin de Tarascon had learned this before he started on his *grande chasse*, and his only dread was lest he should encounter *la femelle*. It is the same with bears and most wild beasts. The males direct their prowess and confine their exertions chiefly to fighting off rival males of their own species, which contributes nothing to the support or protection of the "family." The barnyard cock is often seen to call the hens to a store of food, but these chivalrous attentions, like many human ones, are only paid to those that are least in need of them, and always have reference to a *quid pro quo*. He is never found following the old mother with her brood. She must scratch for herself and her chickens too. Many ungulates are highly polygamous owing to the fierce warfare of the males for

the possession of the females. "In our own country," says Dr. C. Hart Merriam in an unpublished report, "the elk and the buffalo are notorious examples of polygamous animals, single bulls possessing large harems which they defend with most jealous vigilance at the cost of many bloody battles." It is also well known that among the latter of these animals at least there are to be found separate herds or groups of vanquished "bachelor" bulls that are not allowed to remain with the cows. This is certainly a poor way for the males to care for the females. One of the charges against polygamy among human beings is that it necessarily forces the women to perform excessive labor and drudgery, and if animals are capable of doing anything for one another it must be the same with them. A still more extreme case is that of the fur seals. "The male," says Krascheninikow,* "has from eight to fifteen, and even sometimes fifty females, whom he guards with such jealousy that he does not allow any other to come near his mistresses: and though many thousands of them lie upon the same shore, yet every family keeps apart; that is, the male with his wives, young ones, and those of a year old, which have not yet attached themselves to any male; so that sometimes the family consists of one hundred and twenty." This statement made a century and more ago has been abundantly confirmed by later observations as recorded in Dr. Allen's work and still more fully by Dr. Merriam, who, as Bering Sea Commissioner, has recently enjoyed exceptional opportunities for studying the habits of these animals. Here also the bachelors, or "holluschukies" live apart, sometimes occupying separate islands.†

Any required number of facts might be adduced to show that nature makes scarcely any provision for the care and sustenance of the female and young even of the higher animals, and that male superiority here is simply the result of sexual selection, by which those qualities are developed in the male sex which are most admired by the females, among which, as to so large an extent in the human

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* Quoted by Dr. J. A. Allen in his *History of North American Pinnipeds*, Washington, 1880, p. 341–342.

† Report of Dr. C. Hart Merriam in the Fur-Seal Arbitration Case of the United States, 1892.

race, what may be called moral qualities, those that would most benefit the species, play an exceedingly restricted rôle.

Ferrero's examples among the lower, invertebrate types are unfortunate for his position. In bees and the like the male is literally a "drone" and devotes his brief existence wholly to the *Minnedienst*; and while in other insects that he enumerates the female psyche has a sufficiently brief career, that of the male is still further curtailed, many male insects taking no nourishment at all and even lacking the organs for this purpose. It is a strained argument to attempt to show that this brevity of the imago state in insects is due to a lack of division of labor between the sexes. It proves a great deal too much, since many fishes are equally without provision of sexual co-operation, and yet they have somewhat extended lives. But most insects pass the greater part of their lives in the larval state which is often much prolonged as, for example, in the seventeen-year locust or cicada. Weismann has offered the only satisfactory explanation of the apparent anomalies in the duration of life in animals, and Ferrero would do well to consider this more carefully than he seems to have done. All the facts that he advances, while they have no bearing on the theory he is defending, go to support the law of normal female supremacy in nature as it prevails in the lower types and the subsequent reversal of that law by the stronger one of sexual selection operating in the higher types in which the psychic element has gained prominence.

On Ferrero's theory the bad treatment of women by savages constitutes an anomaly in the general course of development. If the higher male animals all worked for their females and offspring, supplying them with food and shelter and defending them from their enemies, while the females did nothing but bear and suckle their young, there certainly would be a marked contrast between their case and that of the savages, among whom, in most cases, it is the women who do all the drudgery work and in many cases supply the tribe with most of the necessaries of life, while the men fight one another and other tribes, or hunt as much for pleasure as for meat, or lounge around the camp eating the food prepared by the women whom they do not allow to eat with them. But, properly viewed,

there is no anomaly in savage life. Among animals there is very little *provision* in the proper sense. Many, it is true, have acquired through natural selection the instinct of storing food, which is usually done by both sexes. Indeed, the most remarkable cases of this are among insects such as bees, where a specialised race of "workers" has been developed. Still more remarkable and opposed to Ferrero's theory, these workers are females that have lost their reproductive powers, though, as pointed out by Herbert Spencer in his last rejoinder to Weismann,* there are not only intermediate forms to some extent even now, but as this condition has been the result of slow development, there must have once been all possible gradations. That is to say, queens are transformed into neuters, and it is the females that do the work. In the higher forms, as I have shown, in so far as there is work to do, the females do their full share, usually much more than their share. The transition from the animal to the savage state in this respect is very slight, and the savage only represents a prolongation of the animal state. The anomaly is not here. It is located farther back. The whole upper part of the animal series may be regarded as anomalous, and the anomaly is a radical one, since it represents a change from normal female superiority to abnormal male superiority, a change brought about by the females themselves through sexual selection, whereby they have surrendered their sceptre and bartered their empire for an æsthetic gratification. To some this may seem a degeneracy, but few would wish wholly to restore the Amazonian *régime*.

The effort of a fully self-conscious intelligence as it exists in the most enlightened types of mankind is to preserve all that is best in woman, to heighten to the utmost that æsthetic attribute through which she has ennobled man and made him what he is. It is no longer woman who selects. From the earliest historic period at least man too has been exercising choice, and female beauty as it now expresses itself in woman is the result. But the progress of civilisation has wrought a change in the æsthetic tastes of mankind, and while physical beauty has lost none of its charm, moral and in-

* *Contemporary Review* for January, 1894.

tellectual beauty have come to hold the first place, and true companionship can only be found in the harmonious union of these three. Such a combination in woman can only be secured through a life of interested activity which unites the exercise of all the faculties with the acquirement of both knowledge and the good things of this world. Agreeable productive labor is the highest and only true source of happiness and worth, whether for man or woman.

LESTER F. WARD.

WASHINGTON, D. C.

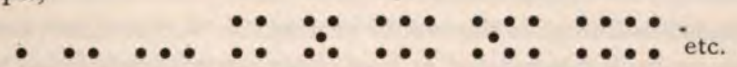
NOTION AND DEFINITION OF NUMBER.

MANY essays have been written on the definition of number. But most of them contain too many technical expressions, philosophical and mathematical, to meet the taste of the non-mathematician. The clearest idea of what counting and numbers mean may be gained from the observation of children and of nations in the childhood of civilisation. When children count or add, they use either their fingers, or small sticks of wood, or pebbles, or similar things, which they separately adjoin to the things to be counted or otherwise ordinally associate with them. As we know from history, the Romans and Greeks employed their fingers when they counted or added. And even to-day we frequently meet with people to whom the use of the fingers is absolutely indispensable for computation.

Still better proof that the accurate association of such "other" things with the things to be counted is the essential element of numeration are the tales of travellers in Africa, telling us how African tribes sometimes inform friendly nations of the number of the enemies who have invaded their domain. The conveyance of the information is effected not by messengers, but simply by placing at spots selected for the purpose a number of stones exactly equal to the number of the invaders. No one will deny that the number of the tribe's foes is thus communicated, even though no name exists for this number in the languages of the tribes. The reason why the fingers are so universally employed as a means of numeration is, that every one possesses a definite number of fingers, sufficiently large for purposes of computation and that they are always at hand.

Besides this first and chief element of numeration which, as we

have seen, is the exact, individual conjunction or association of other things with the things to be counted, is to be mentioned a second important element, which in some respects perhaps is not so absolutely essential, namely, that the things to be counted shall be regarded as of the same kind ; thus, any one who subjects apples and nuts collectively to a process of numeration will regard them for the time being as objects of the same kind, perhaps, by subsuming them under the common notion of fruit. We may therefore lay down provisionally the following as a definition of counting : to count a group of things is to regard the things as the same in kind and to associate ordinally, accurately, and singly with them other things. In writing, we associate with the things to be counted simple signs, like points, strokes, or circles. The form of the symbols we use is indifferent. Neither need they be uniform. It is also indifferent what the spatial relations or dispositions of these symbols are. Although, of course, it is much more convenient and simpler to fashion symbols growing out of operations of counting on principles of uniformity and to place them spatially near each other. In this manner are produced what I have called* natural number-pictures ; for example,



Now-a-days such natural number-pictures are rarely employed, and are to be seen only on dominoes, dice, and sometimes, also, on playing-cards.

It can be shown by archæological evidence that originally numeral writing was made up wholly of natural number-pictures. For example, the Romans in early times represented all numbers, which were written at all, by assemblages of strokes. We have remnants of this writing in the first three numerals of the modern Roman system. If we needed additional evidence that the Romans originally employed natural number-signs, we might cite the passage in Livy VII, 3, where we are told, that, in accordance with a very ancient law, a nail was annually driven into a certain spot in the sanctuary of

* *System der Arithmetik.* (Potsdam : Aug. Stein. 1885.)

Minerva, the "inventrix" of counting, for the purpose of showing the number of years which had elapsed since the building of the edifice. We learn from the same source that also in the temple at Volsinii nails were shown which the Etruscans had placed there as marks for the number of years.

Also recent researches in the civilisation of ancient Mexico show that natural number-pictures were the first stage of numeral notation. Whosoever has carefully studied in any large ethnographical collection the monuments of ancient Mexico, will surely have remarked that the nations which inhabited Mexico before its conquest by the Spaniards, possessed natural number-signs for all numbers from one to nineteen, which they formed by combinations of circles. If in our studies of the past of modern civilised peoples, we meet with natural number-pictures only among the Greeks or Romans, and some Oriental nations, the reason is that the other nations, as the Germans, before they came into contact with the Romans and adopted the more highly developed notation of the latter, were not yet sufficiently advanced in civilisation to feel any need of expressing numbers symbolically. But since the most perfect of all systems of numeration, the Hindu system of "local value," was introduced and adopted in Europe in the twelfth century, the Roman numeral system gradually disappeared, at least from practical computation, and at present we are only reminded by the Roman characters of inscriptions of the first and primitive stage of all numeral notation. Today we see natural number-pictures, except in the above-mentioned games, only very rarely, as where the tally-men of wharves or warehouses make single strokes with a pencil or a piece of chalk, one for each bale or sack which is counted.

As in writing it is of consequence to associate with each of the things to be counted some simple sign, so in speaking it is of consequence to utter for each single thing counted some short sound. It is quite indifferent here what this sound is called, also, whether the sounds which are associated with the things to be counted are the same in kind or not, and finally, whether they are uttered at equal or unequal intervals of time. Yet it is more convenient and simpler to employ the same sound and to observe equal intervals in

their utterance. We arrive thus at natural number-words. For example, utterances like,

oh, oh-oh, oh-oh-oh, oh-oh-oh-oh, oh-oh-oh-oh-oh,

are natural number-words for the numbers from one to five. Number-words of this description are not now to be found in any known language. And yet we hear such natural number-words constantly, every day and night of our lives; the only difference being that the speakers are not human beings but machines—namely, the striking-apparatus of our clocks.

Word-forms of the kind described are too inconvenient, however, for use in language, not only for the speaker, on account of their ultimate length, but also for the hearer, who must be constantly on the *qui vive* lest he misunderstand a numeral word so formed. It has thus come about that the languages of men from time immemorial have possessed numeral words which exhibit no trace of the original idea of single association. But if we should always select for every new numeral word some new and special verbal root, we should find ourselves in possession of an inordinately large number of roots, and too severely tax our powers of memory. Accordingly, the languages of both civilised and uncivilised peoples always construct their words for larger numbers from words for smaller numbers. What number we shall begin with in the formation of compound numeral words is quite indifferent, so far as the idea of number itself is concerned. Yet we find, nevertheless, in nearly all languages one and the same number taken as the first station in the formation of compound numeral words, and this number is ten. Chinese and Latins, Fins and Malays, that is, peoples who have no linguistic relationship, all exhibit in the formation of numeral words the similarity of beginning with the number ten the formation of compound numerals. No other reason can be found for this striking agreement than the fact that all the forefathers of these nations possessed ten fingers.

Granting it were impossible to prove in any other way that people originally used their fingers in reckoning, the conclusion could be inferred with sufficient certainty solely from this agreement with regard to the first resting-point in the formation of compound

numerals among the most various races. In the Indo-Germanic tongues the numeral words from ten to ninety-nine are formed by composition from smaller numeral words. Two methods remain for continuing the formation of the numerals: either we take a new root as our basis of composition (hundred) or we go on counting from ninety-nine, saying tenty, eleventy, etc. If we were logically to follow out this second method we should get tenty-ty for a thousand, tenty-ty-ty for ten thousand, etc. But in the utterance of such words, the syllable *ty* would be so frequently repeated that the same inconvenience would be produced as above in our individual number-pictures. For this reason the genius which controls the formation of speech took the first course.

But this course is only logically carried out in the old Indian numeral words. In Sanskrit we not only have for ten, hundred, and thousand a new root, but new bases of composition also exist for ten thousand, one hundred thousand, ten millions, etc., which are in no wise related with the words for smaller numbers. Such roots exist among the Hindus for all numerals up to the number expressed by a one and fifty-four appended naughts. In no other language do we find this principle carried so far. In most languages the numeral words for the number consisting of a one with four and five appended naughts are compounded, and in further formations use is made of the words million, billion, trillion, etc., which really exhibit only one root, before which numeral words of the Latin tongue are placed.

Besides numeral word-systems based on the number *ten*, logical systems are only found based on the number five and on the number twenty. Systems of numeral words which have the basis five occur in equatorial Africa. (See the language-tables of Stanley's books on Africa.) The Aztecs and Mayas of ancient Mexico had the base twenty. In Europe it was mainly the Celts who reckoned with twenty as base. The French language still shows some few traces of the Celtic vicenary system, as in its word for eighty, *quatre-vingt*. The choice of five and twenty as bases is explained simply enough by the fact that each hand has five fingers, and that hands and feet together have twenty fingers and toes.

As we see, the languages of humanity now no longer possess natural number-signs and number-words, but employ names and systems of notation adopted subsequently to this first stage. Accordingly, we must add to the definition of counting above given a third factor or element which, though not absolutely necessary, is yet important, namely, that we must be able to express the results of the above-defined associating of certain other things with the things to be counted, by some conventional sign or numeral word.

Having thus established what counting or *numbering* means, we are in a position to define also the notion of *number*, which we do by simply saying that by number we understand *the results* of counting or numeration, which are naturally composed of two elements. First, of the ordinary number-word or number-sign; and secondly, of the word standing for the specific things counted. For example, eight men, seven trees, five cities. When, now, we have counted one group of things, and subsequently also counted another group of things of the same kind, and thereupon we conceive the two groups of things combined into a single group, we can save ourselves the labor of counting the things a third time by blending the number-pictures belonging to the two groups into a single number-picture belonging to the whole. In this way we arrive on the one hand at the idea of addition, and on the other, at the notion of "unnamed" number. Since we have no means of telling from the two original number-pictures and the third one which is produced from these, the kind or character of the things counted, we are ultimately led in our conception of number to abstract wholly from the nature of the things counted, and to form the definition of unnamed number.

We thus see that to ascend from the notion of named number to the notion of unnamed number, the notion of addition is necessary, joined to a high power of abstraction. Here again our theory is best verified by observations of children learning to count and add. A child, in beginning arithmetic, can well understand what five pens or five chairs are, but he cannot be made to understand from this alone what five abstractly is. But if we put beside the first five pens three other pens, or beside the five chairs three other

chairs, we can usually bring the child to see that five things plus three things are always eight things, no matter of what nature the things are, and that accordingly we need not always specify in counting what kind of things we mean. At first we always make the answer to our question of what five plus three is, easy for the child, by relieving him of the process of abstraction, which is necessary to ascend from the named to the unnamed number, an end which we accomplish by not asking first what five plus three is, but by associating with the numbers words designating things within the sphere of the child's experience, for example, by asking how many five pens plus three pens are.

The preceding reflexions have led us to the notion of unnamed or abstract numbers. The arithmetician calls these numbers positive whole numbers, or positive integers, as he knows of other kinds of numbers, for example, negative numbers, irrational numbers, etc. Still, observation of the world of actual facts, as revealed to us by our senses, can naturally lead us only to positive whole numbers, such only, and no others, being results of actual counting. All other kinds of numbers are nothing but artificial inventions of mathematicians created for the purpose of giving to the chief tool of the mathematician, namely, arithmetical notation, a more convenient and more practical form, so that the solution of the problems which arise in mathematics may be simplified. All numbers, excepting the results of counting above defined, are and remain mere symbols, which, although they are of incalculable value in mathematics, and, therefore, can scarcely be dispensed with, yet could, if it were a question of principle, be avoided. Kronecker has shown that any problem in which positive whole numbers are given, and only such are sought, always admits of solution without the help of other kinds of numbers, although the employment of the latter wonderfully simplifies the solution.

How these derived species of numbers, by the logical application of a single principle, naturally flow from the notion of number and of addition above deduced, I shall show in a subsequent article entitled "Monism in Arithmetic."

HAMBURG. HERMANN SCHUBERT.

ETHICS AND THE COSMIC ORDER.

A CRITICISM OF PROFESSOR THOMAS H. HUXLEY'S POSITION.

EVER since the doctrine of evolution has been accepted by the thinkers of mankind, the people have shown an extraordinary interest in its ethical and religious corollaries. And who can blame them? For in fact these apparently side issues are after all the main problems, in comparison with which all other inferences and applications sink into insignificance. No wonder that people listen with bated breath when a man of science who is thoroughly familiar with all the results of modern investigations, in their relative certainty and uncertainty, frankly sets forth his views of man's relation to the cosmos. Mankind is yearning for truth, for we need truth. Truth is the daily bread of our spiritual life, and if the sciences are what they pretend to be, if they present to us, each in its own domain, exact statements of truth, religion cannot unheedingly pass them by.

Prof. Thomas H. Huxley's lecture on "Evolution and Ethics," (London: Macmillan & Co., 1893,) appears to be the most important publication of this kind made of late. The view of the great scientist on ethics would have produced a sensation, if he had not prepared the public for its reception by former occasional utterances. His standpoint is radical in the extreme. A Schopenhauer *redivivus*, he denounces in most vigorous terms the world as a whole, and scorns theodicies not less than cosmodicies of all kinds. He boldly declares "that cosmic nature is no school of virtue, but the headquarters of the enemy of ethical nature," and is firmly convinced by the logic of facts "that the cosmos works through the lower nature

of man, not for righteousness, but against it." Ethics has no home here on earth, for according to his drastic comparison, it is like Jack's ascent into fairy-land on the bean-stalk; he says:

"The hero of our story descended the bean-stalk, and came back to the common world, where fare and work were alike hard; where ugly competitors were much commoner than beautiful princesses; and where the everlasting battle with self was much less sure to be crowned with victory than a turn-to with a giant. We have done the like. Thousands upon thousands of our fellows, thousands of years ago, have preceded us in finding themselves face to face with the same dread problem of evil. They also have seen that the cosmic process is evolution; that it is full of wonder, full of beauty, and, at the same time, full of pain. They have sought to discover the bearing of these great facts on ethics; to find out whether there is, or is not, a sanction for morality in the ways of the cosmos."

Professor Huxley leaves no doubt as to his reply to this problem. He sums up the case, saying:

"Thus, brought before the tribunal of ethics, the cosmos might well seem to stand condemned. . . . But few, or none, ventured to record that verdict."

With special severity the great scientist criticises "the fallacies" which pervade the so-called "ethics of evolution." He says:

"As the immoral sentiments have no less been evolved, there is, so far, as much natural sanction for the one as the other. The thief and the murderer follow nature just as much as the philanthropist. Cosmic evolution may teach us how the good and the evil tendencies of man may have come about; but, in itself, it is incompetent to furnish any better reason why what we call good is preferable to what we call evil than we had before."

Concerning the fallacy which identifies "the fittest" and "the best" he says:

"I suspect that this fallacy has arisen out of the unfortunate ambiguity of the phrase 'survival of the fittest.' 'Fittest' has a connotation of 'best'; and about 'best' there hangs a moral flavor. In cosmic nature, however, what is 'fittest' depends upon the conditions. Long since, I ventured to point out that if our hemisphere were to cool again, the survival of the fittest might bring about, in the vegetable kingdom, a population of more and more stunted and humbler and humbler organisms, until the 'fittest' that survived might be nothing but lichens, diatoms, and such microscopic organisms as those which give red snow its color; while, if it became hotter, the pleasant valleys of the Thames and Isis might be uninhabitable by any animated beings save those that flourish in a tropical jungle. They, as the fittest, the best adapted to the changed conditions, would survive."

Professor Huxley goes farther still in his denial of any ethical element in the order of nature. He says:

"For his successful progress, as far as the savage state, man has been largely indebted to those qualities which he shares with the ape and the tiger; his exceptional physical organisation; his cunning, his sociability, his curiosity, and his imitativeness; his ruthless and ferocious destructiveness, when his anger is roused by opposition.

"But . . . these deeply ingrained serviceable qualities have become defects. Civilised man would gladly kick down the ladder by which he has climbed. . . . In fact, civilised man brands all these ape and tiger promptings with the name of sins; he punishes many of the acts which flow from them as crimes; and, in extreme cases, he does his best to put an end to the survival of the fittest of former days by axe and rope.

"The science of ethics professes to furnish us with a reasoned rule of life; to tell us what is right action and why it is so. Whatever difference of opinion may exist among experts, there is a general consensus that the ape and tiger methods of the struggle for existence are not reconcilable with sound ethical principles."

A great part of Professor Huxley's lecture is filled with an appreciative account of Buddha's doctrines. "It is a remarkable indication of the subtlety of Indian speculation," he says, "that Gautama should have seen deeper than the greatest of modern idealists. . . . . Gautama proceeded to eliminate substance altogether; and to reduce the cosmos to a mere flow of sensations, emotions, volitions, and thoughts, devoid of any substratum." But the salient point is, "to the early philosophers of Hindostan, no less than to those of Ionia, it was plain that suffering is the badge of all the tribe of sentient beings"; and suffering "is no accidental accompaniment, but an essential constituent of the cosmic process." Professor Huxley sketches the philosophical evolution of India and Greece as follows:

"In Hindostan, as in Ionia, a period of relatively high and tolerably stable civilisation had succeeded long ages of semi-barbarism and struggle. Out of wealth and security had come leisure and refinement, and, close at their heels, had followed the malady of thought."

Quietism, we are told, was the final outcome of Indian and of Græco-Roman thought; for, says Professor Huxley, the Apatheia of Stoic philosophy and the Nirvâna of Buddhism are very similar.

"The Vedas and the Homeric epos set before us a world of rich and vigorous life. . . . A few centuries pass away and, under the influence of civilisation, the descendants of these men are 'sicklied o'er with the pale cast of thought'—frank pessimists, or at best, make-believe optimists. The courage of the warlike stock may be as hardly tried as before, perhaps more hardly, but the enemy is self. The hero has become a monk. The man of action is replaced by the quietist, whose highest aspiration is to be the passive instrument of the divine Reason. By the Tiber, as by the Ganges, ethical man admits that the cosmos is too strong for him; and, destroying every bond which ties him to it by ascetic discipline, he seeks salvation in absolute renunciation."

This view of life apparently leaves us in utter desolation; but Professor Huxley is not quite so pessimistic as he appears in these quotations. He does not recommend quietism, but proposes that we should fight the cosmos:

"Let us understand, once for all, that the ethical progress of society depends, not on imitating the cosmic process, still less in running away from it, but in combating it."

The risk of combating the cosmic process is great, but Professor Huxley relies on man's intelligence. He continues:

"It may seem an audacious proposal thus to pit the microcosm against the macrocosm and to set man to subdue nature to his higher ends; but, I venture to think that the great intellectual difference between the ancient times with which we have been occupied and our day, lies in the solid foundation we have acquired for the hope that such an enterprise may meet with a certain measure of success.

"The history of civilisation details the steps by which men have succeeded in building up an artificial world within the cosmos."

Accordingly, in Professor Huxley's mind, artificiality built upon intelligence, is the saving power! All his denunciations of "the injustice of the nature of things, of the unethical character of the cosmic order, and of the moral indifference of the selective factors of evolution" serve simply as a foil to this idea. But Professor Huxley does not appear to see, that there is no choice left us. If our rules of conduct do not ultimately rest upon the order of nature, they must be of supernatural origin. That kind of art, of intelligence, and of theory, which is artificial in the sense that it neither grows out of nature nor remains in agreement with the laws of nature, but combats the cosmic order, is nothing but a dream, an impossibility; and thus

the final outcome of the whole lecture would be highly disappointing, if the five concluding paragraphs did not contain a few sentences which stand in striking contrast to the rest. Considering the fact that "the organised and highly developed sciences and arts of the present day have endowed man with a command over the course of non-human nature greater than that attributed to the magicians," Professor Huxley sees "no limit to the extent to which intelligence and will, guided by sound principles of investigation, and organised in common effort, may modify the conditions of existence, for a period longer than that now covered by history." But he adds:

> "I deem it an essential condition of the realisation of that hope that we should cast aside the notion that the escape from pain and sorrow is the proper object of life."

If escape from pain and sorrow is not the proper object of life, Professor Huxley need not be so impatient at the existence of pain and suffering. Intelligence and will, he says, must be "guided by sound principles of investigation"; but what are "sound principles of investigation" if not those by which we succeed in solving the problems of existence; sound are such principles only as are endorsed by the cosmos. Trust in science is incompatible with denunciations of the cosmic order. To show the full significance of this idea we shall now review Professor Huxley's propositions and call attention to what we consider the defects of his argument.

* * *

We miss in Professor Huxley's writings any definite and clear meaning of the term ethics. Ethics is the science of moral conduct. But what do we mean by "moral goodness." Will Professor Huxley be satisfied to accept without criticism the traditional meaning of morality? Is he good who keeps the ten Mosaic commandments, or he who loves his enemies and resists not evil? Must we consider as moral the Christian injunction to turn the left cheek to him who smites us on our right cheek? Or must we regard him as good who follows the Homeric principle of excelling all others?* Shall we adopt the hedonistic view and define good as that which produces

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* *αἰὲν ἀριστεύειν καὶ ὑπείρμενον ἔμμεναι ἄλλων.*

the greatest amount of pleasurable feelings? Who shall decide whether your conception of good and evil, or mine, or that of the Christian, or that of the Greek, or that of the Buddhist, or that of the Confucian is to be regarded as the standard?

Judging from one passage of the present lecture, Professor Huxley may have adopted the intuitionalist view, which claims that good cannot be defined and that in our judgment of it we must rely upon our intuition.* Intuitionalism, however, will render ethics, as a science, impossible, and relegate it to the realm of unsettled opinions. The proposition that all intuitions are equally justified, each one in its own subjective sphere, practically amounts to a most radical denial of ethics, as much so as agnosticism, when declaring that the fundamental problems of philosophy are insolvable, is tantamount to a denial of philosophy as a science.

Is there any other criterion than experience, and what is the test of experience but an appeal to the cosmic order of nature? Indeed, we have no choice left us, but must investigate all the different ethical systems to determine which one is the strongest, which one will produce the type of mankind that is fittest to survive; which one is best adapted to the cosmic order of the world.

The cosmos and the constitution of the cosmos must after all furnish us the necessary data from which we have to construct our criterion of ethics. Ethics is not a Jack's ascent to fairy-land on a bean-stalk, but a systematic presentation of the rules of conduct for practical life. Professor Huxley rightly urges that the survival of the fittest among plants depends upon surrounding conditions; under unfavorable conditions, such as prevail in the arctic zones and on the Alpine ridges, mosses and lichens only will survive, while the Sahara is uninhabitable for civilised mankind. In the same way we urge that in the survival of the fittest in society and also in the survival of the fittest among the different systems of society, those will survive that adapt themselves most closely to the conditions which

*He says: "Some day, I doubt not, we shall arrive at an understanding of the evolution of the æsthetic faculty; but all the understanding in the world will neither increase nor diminish the force of the intuition that this is beautiful and that is ugly."

social life necessarily exhibits according to the constitution of the cosmos.*

Professor Huxley says that "man has been largely indebted for his successful progress to those qualities which he shares with the ape and tiger . . . and he now kicks down the ladder by which he has climbed." This is a misstatement of the case. If by "those qualities" Professor Huxley means, as he explicitly says, "those ape and tiger promptings" which "civilised man brands with the name of sins," he is obviously mistaken. If that were so, why have neither the tiger nor the ape attained to the power of man? We cannot consider the rise of man's power a mere accident, for it is plain enough that ape and tiger have failed to adapt themselves to the conditions of a higher life, while man has climbed the ladder, because of his rational insight, which reveals to him a truer knowledge of things and enables him to adapt his methods more perfectly to the cosmic order of existence. However, if Professor Huxley means those nobler qualities of ape and tiger which these animals share with man, viz., sociability, imitativeness, or a talent of adaptation to circumstances in the ape, and indomitable energy in the tiger, we should say that civilised man has no reason "to kick down the ladder by which he has climbed." On the contrary, the stronger these qualities are in him, the more rapidly will he advance in the future.

Says Professor Huxley:

"Social progress means a checking of the cosmic process at every step and the substitution for it of another, which may be called the ethical process; the end of which is not the survival of those who may happen to be the fittest, in respect of the whole of the conditions which exist, but of those who are ethically the best."

We say: Social progress becomes possible *only* through a more comprehensive and deeper understanding of the cosmic order of the world, and it consists in a more and more perfect adaptation to the

* That "the best" societies are in the long run "the fittest to survive," does not exclude the fact that what in social life appears as a "defect" is often actually favorable for the preservation of animals and plants and also of single individuals. The terms "best" and "fittest to survive" must therefore not be regarded as identical. As it would lead us too far here to discuss the problem in detail, we refer the reader to the articles, "The Test of Progress" and "The Ethics of Evolution," in *Homilies of Science*, pp. 36–47.

ethical rules derived from our better insight into the laws of our being.

While speaking disparagingly of theodicies, Professor Huxley says they are, so far as he knows, "all variations of the theme set forth in those famous six lines of Pope," which end with the words:

> "And spite of pride, in erring reason's spite,
> One truth is clear: whatever is, is right."

Professor Huxley justly criticises this sentiment which stifles every aspiration and paralyses every effort, saying: "Why try to set right what is right already? Why strive to improve the best of all possible worlds? Let us eat and drink, for as to-day all is right, so to-morrow all will be."

Here we would suggest to Professor Huxley that he make a distinction between the facts of nature and the cosmic constitution of the world. The world as it now surrounds us, the present state of things is such as it is in consequence of innumerable events, which, according to the law of cause and effect, have produced us and our surrounding conditions. One of the most obtrusive features of existence is that the present state of things and the conditions which surround us are always imperfect. There is always room for improvement; the path of progress is infinite, and whatever is, is always somehow faulty. The cosmic order of the world, however, is immutable and above all attempts at improvement. The constitution of the universe consists in those features of reality which the scientist describes in what we commonly call the laws of nature. It is, for instance, a constitutional feature of the universe that lies have injurious effects upon those who accept them as truths, and also upon those who promulgate them, as soon as they are found out. We call such consequences of evil deeds their curses. Now, we should say that such evil conditions as are the consequences of sin, are in themselves evils, but the law, that makes curses the wages of sin, is no evil.

We do not intend to write either a Theodicy or a Cosmodicy, because neither God nor the cosmos needs it; they justify themselves. Just as much as they are above all criticism, they need no defence from the poor pen of a mortal scribbler. There is no use

either for an indictment of the cosmic order, or for a condemnation of it, or for a justification of it, since we can neither convict it, nor punish it, nor educate it to our peculiar views of moral goodness.

All indictments of the cosmic order, such as those made by John Stuart Mill and Professor Huxley, are mere misstatements of the case. That the world is full of misery cannot be denied; it is also true that the evil-doer involves in the curse of his sin a great number of other persons, and that pain and suffering are necessary accompaniments and essential constituents of life; but those, who like Mill, solemnly arraign nature for "deliberate" murder because every living being that is born must die, and those who like Huxley, when speaking of pleasures and pains, make the objection that "it is admittedly impossible for the lower orders of sentient beings to deserve (sic!) either the one or the other," are guilty of anthropomorphism.

We may speak of "the unfathomable injustice of the nature of things" only when we look upon the world as a whole, as a personal being, and upon every single man as an individual soul-entity, who, from some unknown sphere is, like Hamlet, "a no less blameless dreamer, dragged, in spite of himself, into a world out of joint."* This view adopts the old, mythological theory, which individualises God and man, yet drops at the same time those other allegorical notions of immortality and a transcendental heaven above the world which are its indispensable complements. It is natural that when we remain with one foot in the old domain of thought and simply lift the other without yet stepping into the next higher sphere of progress, we have assumed no firm position. He who takes such an attitude should not, because of the inconsistency of his own position, blame the world. If a man looks through spectacles which contain lenses of greatly different strength, he must not complain that things are out of shape, but must seek the fault in the medium through which he looks at his surroundings.†

* These are Huxley's own words, *Evolution and Ethics*, p. 13.

† John Stuart Mill's denunciation of Nature which anticipates some of the most vigorous expressions of Professor Huxley, is found in his essay on Nature. For a criticism of Mill's position see the writer's article "Nature and Morality" (*The Open Court*, Nos. 239, 241, and 242).

The attitude of both Mr. Mill and Professor Huxley is the more singular as both must be perfectly conscious of the erroneousness of their position. Professor Huxley indeed recognises the fact that, "strictly speaking, social life and the ethical process are part and parcel of the general process of evolution"; but this statement appears only in a forlorn passage among the notes of his appendix. He makes no use of it and bases the main propositions of his lecture upon statements that are only loosely speaking correct.

Professor Huxley might have found a cosmodicy in the Buddhist doctrine of Karma which he admirably epitomises as follows:

"Everyday experience familiarises us with the facts which are grouped under the name of heredity. Every one of us bears upon him obvious marks of his parentage, perhaps of remoter relationships. More particularly, the sum of tendencies to act in a certain way, which we call 'character,' is often to be traced through a long series of progenitors and collaterals. So we may justly say that this 'Character'—this moral and intellectual essence of a man—does veritably pass over from one fleshly tabernacle to another and does really transmigrate from generation to generation. In the new-born infant, the character of the stock lies latent and the Ego is little more than a bundle of potentialities. But, very early, these become actualities; from childhood to age they manifest themselves in dullness or brightness, weakness or strength, viciousness or uprightness; and with each feature modified by confluence with another character, if by nothing else, the character passes on to its incarnation in new bodies.

"The Indian philosophers called character, as thus defined, 'karma.' It is this karma which passed from life to life and linked them in the chain of transmigrations; and they held that it is modified in each life, not merely by confluence of parentage, but by its own acts."

Professor Huxley adds in his notes:

"In the theory of evolution, the tendency of a germ to develop according to a certain specific type, e. g., of the kidney bean seed to grow into a plant having all the characters of *Phaseolus vulgaris* is its 'Karma.' It is the 'last inheritor and the last result' of all the conditions that have affected a line of ancestry which goes back for many millions of years to the time when life first appeared on the earth. . . . As Prof. Rhys Davids aptly says, the snowdrop 'is a snowdrop and not an oak, and just that kind of a snowdrop, because it is the outcome of the Karma of an endless series of past existences.' ('Hibbert Lectures,' p. 114.)"

If this Buddhistic view of Karma is correct, the present state of existence on earth is the exact product of the actions that have

taken place here upon our planet since its formation as an independent body in the solar system. The constitution of the universe is such that we reap as we have sown. When we say "we," it is understood that it means not our present individualised existence only, but our entire Karma, past, present, and future. It includes all the causes of our being; even the bad company from whose vices we suffer are, in this sense, a part of our own making. Thus it becomes apparent that not God is guilty of the evil conditions of our state of being, but we ourselves; we have not been "dragged into a world out of joint," but we ourselves are the creators, not only of our character, but also of the plight in which we are. There is no fault to be found with the constitutional order of being which punishes those who go astray; we alone are the sinners, and if we expect delivery from evil, we must be our own saviours.

It appears to be Professor Huxley's opinion that Buddha and all those moral teachers whose final goal of moral conduct he characterises as quietism, have condemned the cosmos; but this proposition is more plausible than correct. We think that Buddha's position was slightly different from what Professor Huxley represents it. Buddha taught a suppression of all sinful desires, of selfishness, covetousness, and lusts, but at the same time did not tire in his exhortations of rousing oneself from indifference to energetic activity, and of working out one's own salvation with diligence. Whatever Buddha may have taught, we should say that energetic work and intense activity is one of the most urgent demands which the constitution of the cosmos makes on all its children. And we trust that no great moral teacher, Buddha not excepted, was a quietist in the usual sense of the term.

Professor Huxley says (on page 33):

> "The practice of that which is ethically best—what we call goodness or virtue—involves a course of conduct which, in all respects, is opposed to that which leads to success in the cosmic struggle for existence. In place of ruthless self-assertion it demands self-restraint."

It is true enough, that goodness or virtue requires not "self-assertion," but "self-restraint"; or as Professor Huxley says on page 29, "the enemy is self." But it is not true that self-restraint

is "a course of conduct which in all respects is opposed to that which leads to success in the cosmic struggle for existence." Even tigers succeed in the struggle for existence only because their self-assertion is tempered with self-restraint; and man succeeds better than tigers and apes, in exactly the degree in which he is more perfectly familiar with the conditions that lead to success in that struggle. Man uses his knowledge with greater energy, not of muscle, but of mental concentration, and with more complete self-possession. Buddha's quietism (if I interpret his Dharma rightly) consists in the recognition of the truth that "self is the enemy," but while we must replace self-assertion by self-restraint, we must not sink into the indolence of quietism. On the contrary, all the energy which human tigers waste in the service of selfishness should be employed to promote those duties which the cosmic order prescribes.

If Professor Huxley had recognised the difference which obtains between the laws of nature and the temporary state of things, he would scarcely have filed his indictment against the cosmic order. The laws of nature are a constitutional feature of the universe; they are irrefragable, immutable, eternal, and admit of no exception. It makes no difference whether we praise the cosmic order or denounce it, whether we like it or dislike it. It is the voice of God; nay, it is God himself in all his omnipotence and sternness. It is the Jahveh who was, is, and will be. We may, with Professor Huxley, bring it before the tribunal of ethics and boldly declare that it stands condemned; but we cannot set up a rule of life against it. Nothing will stand that contradicts it, and no definition of moral goodness goes to the bottom of truth, unless it casts its anchor in this bedrock of facts.

Professor Huxley believes in the efficacy of "intelligence and will guided by sound principles of investigation"; in a word, he believes in science. And here we find ourselves in perfect agreement with him. We only wish him to know that if he adopts this belief in science as a living faith applicable to practical life and uses it for the elaboration of an ethical system, it will, if consistently thought out in all its consequences, lead him to that world-conception which we call the Religion of Science.

Belief in science means that truth can be investigated, found, and clearly stated; and truth clearly stated reveals to us the rules of right conduct.

Are science, and truth, and also the higher life of civilisation, as it becomes possible by a better understanding of truth,—are they indeed artificial worlds within the cosmos; do they really stand in such contradictory opposition to the cosmic order of nature as Professor Huxley would fain make us believe? Is the animal nearer than man to nature, and is ploughing, as Mr. Mill states, an infringement upon the natural order of things? Certainly not. For what are the results of science, but a knowledge of the world? They furnish us with a revelation of the constitution of the universe! And what is truth but a perfect description of the facts of nature summed up in their essential and permanent features? Will Professor Huxley glorify science and condemn that reality which science reveals? Will he exalt truth and scorn the original whose copy and portrait truth is? Will he boast of man's intelligence and the scientist's "sound principles of investigation," while he laughs to scorn the order of the cosmos, which is the prototype of man's reason and the God in whose image rational beings have been created?

The epiphany of truth in science and the religious trust in the ethical worth of truth proves that God—not the personal God of supernaturalism, but the superpersonal God of a scientific conception, the life that beats in our hearts and quickens every atom of the universe—is a living power still. We confess that we have abandoned the old, narrow dogmatism of the traditional religions, which Professor Huxley has frequently taken occasion to criticise with caustic humor and severe ridicule. But our attitude differs from his in one respect: we reject the mythology of religion only, but not its essential meaning. The Religion of Science preserves all that is worth preserving. It preserves the holy zeal for the ideals of righteousness and justice; it cherishes a personal relation to the source of our being and the authority of moral conduct; it stimulates the fervid aspiration onward through toil, disappointments, and sacrifices to victory; through doubt and darkness to light; and through hours of tribulation and anxiety to a bright fulfilment of

our hopes. "He that sat upon the throne said: Behold I make all things new. And he said unto me, Write: for these words are true and faithful."

EDITOR.

KARMA AND NIRVANA.

ARE THE BUDDHIST DOCTRINES NIHILISTIC?

BUDDHISM is generally characterised as a religion without a belief in God and the human soul, without the hope of a future existence, pessimistic and desolate, looking upon life as an ocean of suffering, quietistic in ethics, and finding comfort only in the expectation of a final extinction in nothingness. Now, it is true that Buddhists, with the exception of some less important heretical sects, do not believe in a personal God ; but, while on the one hand, there are many faithful Christians who look upon the theistic dogma merely as the symbolical expression of a deeper truth, on the other hand, the Buddhists believe not only in the Sambhôga Kâya which is an equivalent of the Christian God-idea, but even in a trinity of Sambhôga Kâya, Nirmâna Kâya, and Dharma Kâya, bearing a close resemblance to the Christian conception of Father, Son, and Holy Ghost. Further, it is undeniable that Buddhists do not believe in the âtman or Self which is the Brâhman philosophers' definition of soul, but they do not deny the existence of mind and the continuance of man's spiritual existence after death. Men trained in Western modes of thought, however, are so accustomed to their own terminology that Eastern thinkers, when using expressions denying the allegoric terms of Christian thought, are suspected of negativism. Even Western thinkers who have ceased to be believers in Christianity fail to see the positive aspect of the Buddhist world-conception, and we are again and again confronted with the refrain : If Buddha's doctrine is not nihilism, it practically amounts to nihilism.

Benfey says in the preface to his translation of the "Pantscha Tantra":

"The very bloom of the intellectual life of India (whether it found expression in Brahmanical or Buddhist works) proceeded substantially from Buddhism, and is contemporaneous with the epoch in which Buddhism flourished;—that is to say, from the third century before Christ to the sixth century after Christ. Taking its stand upon that principle, said to have been proclaimed by Buddhism in its earliest years, 'that only *that* teaching of the Buddha's is true which contraveneth not sound reason,'* the autonomy of man's Intellect was, we may fairly say, effectively acknowledged; the whole relation between the realms of the knowable and of the unknowable was subjected to its control; and notwithstanding that the actual reasoning powers, to which the ultimate appeal was thus given, were in fact then not altogether sound, yet the way was pointed out by which Reason could, under more favorable circumstances, begin to liberate itself from its failings. We are already learning to value, in the philosophical endeavors of Buddhism, the labors, sometimes indeed quaint, but aiming at thoroughness and worthy of the highest respect, of its severe earnestness in inquiry. From the prevailing tone of our work, and still more so from the probable Buddhist origin of those other Indian story-books which have hitherto become known to us, it is clear that, side by side with Buddhistic earnestness, the merry jests of light, and even frivolous poetry and conversation, preserved the cheerfulness of life."

This description does not show Buddhism in a gloomy light, and it is different from what people usually imagine it to be.

In spite of the innumerable exuberances of modern Buddhism, its power and possibilities are still great mainly because it enjoins on its devotees the free exercise of their reasoning powers. Among all religious men Buddhists more than others appear to be at the same time full of religious zeal and also open to conviction. We read in Charles D. B. Mill's book "Buddha and Buddhism," p. 76:

"The Regent of Lhassa declared perpetually to the Catholic missionaries Huc and Gabet, as they tell us, 'Your religion is like our own, the truths are the same; we differ only in the explanation [exposition]. Amid all that you have seen and heard in Tartary and Thibet you must have found much to condemn; but you are to remember that many errors and superstitions that you may have observed, have been introduced by ignorant Lamas, but are rejected by intelligent Buddhists.' 'He admitted between us and himself only two points where there was disagreement—the origin of the world and the transmigration of souls.' 'Let us examine them both

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* Wassiliew, *Der Buddhismus*, etc., p. 68.

together,' said he to them again, 'with care and sincerity; if yours is the best, we will accept it; how could we refuse you? If, on the other hand, ours is best, I doubt not you will be alike reasonable, and follow that.'"

Now it is strange that in those two points which constitute the main differences between Buddhism and Christianity, viz. creation and the nature of the soul, modern science, represented exclusively by scientists educated in Christian schools and with a Christian tradition of two millenniums, will certainly side with Buddhism. There is scarcely any one among our scientists who would be willing to endorse a creation out of nothing, and among our prominent psychologists few only will be found who adhere to the dualistic soul-conception which assumes the existence of a psychic agent behind the facts of soul-life. Nevertheless our popular conception of a Creator-God and an ego-soul are so deeply rooted in the minds of our people that, as a rule, they still consider these two ideas as the indispensable foundations of all religion.

We intend here briefly to review the fundamental conceptions of Buddhism, and hope to prove that although its doctrines of the soul and of Nirvâna may to Western minds appear to be the equivalent of nihilism, they certainly are not nihilism if we take the trouble to look at them from the Buddhist standpoint. And far from being pessimistic in the Western sense of pessimism, the Buddhist possesses a cheerful disposition which in this world of tribulation lifts him above pain and suffering.

THE BUDDHIST CONCEPTION OF THE SOUL.

Soul was identified by Brahmanical philosophers with the âtman, the self, the ego, or the ego-consciousness, viz., that something in man which says "I." This âtman was conceived as a metaphysical entity behind man's sensations, thoughts, and other activities. Not the eye sees, they said, but the seer in the eye; not the ear hears, but the hearer in the ear; not the tongue tastes, but the taster in the tongue; not the nose smells, but the smeller in the nose; not the mind thinks, but the thinker in the mind; not the feet walk and the hands act, but the actor in the hands and the feet. The mysterious being in man which says "I am this person, I possess eyes,

ears, nose, tongue, hands and feet, I see, hear, smell, taste, feel the contact of bodies, walk and act," is said to be the agent of man's activity. This "I" or the ego of the soul, the agent of man's activity, is called the âtman or self; and in so far as the existence of the âtman is denied by Buddha, Buddhism teaches that there is no soul.

When Buddhists speak of the soul, they mean the Brahmanical âtman. When they mean what we would call soul, they speak of mind; and Buddhism, far from denying the existence of mind, only replaces the dualistic conception of Brahmanical philosophy by a monistic soul-theory, which in the course of time naturally developed the doctrine that there is nothing but mind.

The phrase "there is nothing but mind," reminds us of Clifford's dictum: Everything that exists is mind-stuff; and it may be explained as follows: All outside things appear to us as matter moving in space; so we appear to other beings as matter moving in space; we appear to be body to our own and to other people's senses; but in ourselves we feel our existence as that which we call mind or soul. Body is that as which mind or soul appears. Our body consisting of the same material as the things of the surrounding world and having originated therefrom, we conclude that all the world consists of the same material. All that which appears to us as matter can, if it but assume the proper form, become such minds as we are; in a word: all existence is spiritual, or more exactly speaking, psychical.*

The psychology of Buddhism is briefly laid down in the first verse of the Dhammapada:

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* In a partial accommodation to the Buddhist usage of terms, who, as a rule, translate *âtman* with "soul" and that which we would call "soul," i. e., the totality of our thoughts, sensations, and aspirations with "mind," we speak here of "soul or mind." Otherwise, and according to a stricter usage of terms we propose to make a distinction. When speaking of "soul," we mean mainly the feeling or sentient element of man's existence; when of mind, we think mainly of the intellectual and rational features with which the various feelings are endowed. Thus it would have been more proper for Clifford to say "soul-stuff" instead of "mind-stuff"; and the Buddhist doctrine, "everything is mind," should be expressed in the sentence: "Every reality which appears to sentient beings as objective, is in itself subjective; we call it matter, but it is in itself potential feeling; it can become sentient, it is soul, or better, soul-stuff." For details of definitions see *Primer of Philosophy*.

"All that we are, is the result of what we have thought: it is founded on our thoughts, it is made up of our thoughts."

This shows that Buddhism does not deny the existence of the soul, if by soul is meant man's ideas, aspirations, and mental activities. Buddhists declare that man's soul is not an indissoluble unit, not a transcendental self, but a compound. His physical and spiritual being consists of sangskâras,* i. e., of certain forms and formative faculties which, according to the law of Karma, preserve his existence in the whirl of constant changes. Oldenberg translates the word sangskâra by *Gestaltung*, and says in explanation of the term (p. 242, Engl. Transl.):

"We might translate Saṁkhâra directly by 'actions' if we understand this word in the wide sense in which it includes also, at the same time, the internal actions, the will and the wish."

It is the formative element which shapes our existence and destiny. Oldenberg continues:

"Buddhism teaches: 'My action is my possession, my action is my inheritance, my action is the womb which bears me, my action is the race to which I am akin, my action is my refuge.' (Anguttara Nikâya, Pañcaka Nipâta.) What appears to man to be his body is in truth 'the action of his past state which then assuming a form, realised through his endeavor, has become endowed with a tangible existence.'"

The Jewish-Christian world-conception represents us as the creatures of God. We are like vessels in the potter's hand; some of us are made for noble purposes, others as vessels of impurity. Buddhists look upon our character and fate as the result of our own doings in our present and innumerable past existences. In this sense the Dhammapada† says:

"By oneself the evil is done; by oneself one suffers.
By oneself evil is left undone; by oneself one is purified.
Purity and impurity belong to oneself, no one can purify another.
You yourself must make an effort. The Buddhas are only preachers.
The way was preached by me when I understood the removal of the thorns in the flesh."

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*The customary transcription of this term is "Saṁskâra" in Sanskrit and "Saṅkhâra" in Pâli; the dots over the "m" and "n" indicate that they are to be pronounced as "ng" in English.

† *Sacred Books of the East*, Vol. X, pp. 46 and 67.

According to Buddhist doctrines, the souls of men continue to exist as they are impressed upon other generations by heredity and education. A man remains the same from yesterday until to-day, and from to-day until to-morrow, in so far as he consists of the same sangskâras; his character remains the same, exactly as a light burning several hours remains the same light, although the flame is always fed by other particles of oil.* The man of the same character as you, is the same as you, in somewhat the same sense as two triangles of equal angles and sides are congruent. This is tersely expressed in the saying *Tat twam asi*, "That art thou," which Schopenhauer makes the cornerstone of ethics, for this view of the soul, recognising oneself in others, removes all motives of selfishness.

There are two isolated passages in the Dhammapada which apparently are a contradiction of Buddha's doctrine of the illusion of self. We read in verse 160: "Self is the lord of self. Who else could be the lord"; and in verse 323: "A man who controls himself enters the untrodden land through his own self-controlled self." Prof. Max Müller, who is himself a champion of the âtman doctrine, makes the most of these passages, in proving that Buddha might have taught the existence of self. But his proposition is improbable in the face of so many other unequivocal statements. Moreover, the general meaning of the quoted sentences is unmistakable. There is no reference to the existence of a self in the sense of the Brahmanical âtman. The author of these passages—whether Buddha himself, or a Buddhist, or, what is not improbable, some thinker older than Buddha—simply means that "by self-control alone man can attain salvation," but we have no right to interpret the words in a sense which would antagonise one of the cardinal doctrines of Buddhism. We must bear in mind that Buddha does not deny the existence of the idea of self in man. He only denies the existence of a soul-substratum such as was assumed under the name of self by the most prominent philosophers of his time. Buddha does not deny that there is an ego-consciousness in the soul. He only rejects the assumption that our ego-consciousness is the doer of our acts,

* This simile is used in *The Questions of Milinda*.

and the thinker of our thoughts, or a kind of thing-in-itself behind our existence.

There are many words which are used in various applications, implying radically different or even contradictory meanings, and the word "self" is in this respect no exception. Generally speaking, self is that idea in a man's mind which represents the totality of his existence, his bodily form, his senses and their activities, his thoughts, his emotions, his likes and dislikes, his aspirations and hopes. Far from proposing to exterminate self in this sense, Buddha's religion preaches the elevation and sanctification of every one's self, so much so that Oldenberg characterises the ethics of Buddhism as self-culture and self-discipline ("sittliche Arbeit an sich selbst"), as expressed in verse 239 of the Dhammapada:

"Let a wise man blow off the impurities of his self as a smith blows off the impurities of silver, one by one, little by little, and from time to time."

When Buddhists speak of the illusion of self, denouncing the idea of self as the main cause of all evil, they mean that erroneous notion which not only hypostatises the idea of self into an independent being, but even makes of it the metaphysical agent of all our activities. The adoption of this metaphysical self-conception is said to warp all our thoughts and to dim our spiritual vision; it makes us neglect the true substance of our soul for a mere shadow.

Buddha, while denying the Brahmanical theory of the âtman, offered a new solution of the problem of the soul. Says Rhys Davids in his "Hibbert Lectures," p. 29:

"The distinguishing characteristic of Buddhism was that it started a new line, that it looked upon the deepest questions men have to solve from an entirely different standpoint. It swept away from the field of its vision the whole of the great soul-theory which had hitherto so completely filled and dominated the minds of the superstitious and the thoughtful alike. For the first time in the history of the world, it proclaimed a salvation which each man could gain for himself and by himself, in this world, during this life, without any the least reference to God, or to gods, either great or small. Like the Upanishads, it placed the first importance on knowledge; but it was no longer a knowledge of God, it was a clear perception of the real nature, as they supposed it to be, of men and things. And it added to the necessity of knowledge, the necessity of purity, of courtesy, of uprightness, of peace, and of a universal love far-reaching, grown great and beyond measure."

While Self, thus, that hypothetical agent behind the soul, disappears in the teachings of Buddhism, the conception soul or mind is not abolished and the idea of soul-transmigration gains a new importance. The pre-Buddhistic notion of a soul flitting about and seeking a new abode in another body was given up by Sâkyamuni for the more correct idea of a transfer of the Sangskâras according to the law of Karma. Buddhism recognises the law of Karma as irrefragable and bases upon it the unfailing justice of the moral law.

Concerning the migration of souls underlying the moral of the Jâtaka-tales in the "Buddhist Birth Stories," Prof. Rhys Davids says in the preface to his translation, p. lxxv:

"The reader must of course avoid the mistake of importing Christian ideas into this Conclusion by supposing that the identity of the persons in the two stories is owing to the passage of a 'soul' from the one to the other. Buddhism does not teach the Transmigration of Souls.* Its doctrine would be better summarised as the Transmigration of Character; for it is entirely independent of the early and widely-prevalent notion of the existence within each human body of a distinct soul, or ghost, or spirit."

The same author says in his manual of "Buddhism." p. 104:

"As one generation dies and gives way to another—the heir of the consequences of all its virtues and all its vices, the exact result of pre-existing causes; so each individual in the long chain of life inherits all, of good or evil, which all its predecessors have done or been; and takes up the struggle towards enlightenment precisely there, where they have left it."

Speaking of Karma, Professor Davids explains the nature of Buddhism as follows:

"Most forms of Paganism, past and present, teach men to seek for some sort of happiness here. Most other forms of belief say that this is folly, but the faithful and the holy shall find happiness hereafter, in a better world beyond. Buddhism maintains that the one hope is as hollow as the other; that the consciousness of self is a delusion; that the organised being, sentient existence, since it is not infinite, is bound up inextricably with ignorance, and therefore with sin, and therefore with sorrow. 'Drop then this petty foolish longing for personal happiness,' Buddhism would say! 'Here it comes of ignorance, and leads to sin, which leads to sorrow; and there the conditions of existence are the same, and each new birth will leave you ignorant and finite still. There is nothing eternal; the very cosmos itself is

* I. e., of âtmans.

passing away; nothing is, everything becomes; and all that you see and feel, bodily or mentally, of yourself will pass away like everything else; *there will only remain the accumulated result of all your actions, words, and thoughts.** Be pure then, and kind, not lazy in thought. Be awake, shake off your delusions, and enter resolutely on the "Path" which will lead you away from these restless, tossing waves of the ocean of life;—the Path to the Joy and Rest of the Nirvâna of Wisdom and Goodness and Peace!'"

Rhys Davids says: "There will only remain the accumulated result of all your actions, words, and thoughts." True; but why does he say "only"? The accumulated result of your actions (viz., your sangskâra) *are* your own being. They constitute your mind so long as you live, and there is no self behind them, no ego, no âtman, no metaphysical soul-monad. Thus it appears that, according to Buddhist notions, we ourselves continue in the accumulated results of our actions. Since Prof. Rhys Davids fails to bear in mind that our Sangskâras are we ourselves, it is perhaps natural that he, although one of the profoundest of Buddhist scholars, does not, in spite of his perfect knowledge of facts, appreciate the importance of the Buddhistic conception of Karma and the migration of soul. I do not say that he misunderstands this part of the Buddhist doctrine; but I say that he does not appreciate it. He continues the passage just quoted:

"Strange is it and instructive that all this should have seemed not unattractive these 2,300 years and more to many despairing and earnest hearts—that they should have trusted themselves to the so seeming stately bridge which Buddhism has tried to build over the river of the mysteries and sorrows of life. They have been charmed and awed perhaps by the delicate or noble beauty of some of the several stones of which the arch is built; they have seen that the whole rests on a more or less solid foundation of fact; that on one side of the keystone is the necessity of justice, on the other the law of causality."

Then, he adds:

"But they have failed to see that the very keystone itself, the link between one life and another, is a mere word—this wonderful hypothesis, this airy nothing, this imaginary cause beyond the reach of reason—the individualised and individualising force of Karma.

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* Italics are ours.

Prof. Rhys Davids adds in a foot-note:

"Individualised, in so far as the result of a man's actions is concentrated in the formation of a second sentient being; individualising, in so far as it is the force by which different beings become one individual. In other respects the force of Karma is real enough."

Modern science teaches that it is function which creates the organ, and, *vice versa*, the organ is but the visible result of innumerable former functions. This may be considered as a modern restatement of the Buddhist doctrine of the Sangkhâras. All the seeings of ancestral eyes continue to live in our eyes. Our ancestors are not dead; they are still here in us; and by ancestors the Buddhist understands not only progenitors, but also those who formed our soul. Sâkyamuni says to his father, that not he and his fathers, the Kings of the Sâkya, but the Buddhas of former ages were his ancestry.

In the name of Buddhism, I venture to make a reply to Prof. Rhys Davids: Buddhism has torn down the imaginary fence which separates man's self from other selves. He who fails to see the link between one life and another, or speaks of it as an "airy nothing," still holds to the illusion of self. He who abandons the idea of self must recognise the sameness of two souls consisting of the same Sangskâras. Otherwise we ought to deny also the sameness of the "I" of to-day and of yesterday. That which constitutes the identity of person in one and the same individual is only the continuity and the sameness of his character. The "I" of to-day has to take all the consequences of the actions which the "I" of yesterday performed. Thus the individualised Karma of future times will reap all that which the individualising Karma of the present time sows.*

And, strange enough, this Buddhistic conception of the soul is quite in harmony with the views of the most prominent psychologists of Europe.

The objection may be urged against the Buddhist conception that we do not choose to look upon the men who in future times will represent the incarnation of our Karma as identical with ourselves;

* For an excellent restatement of the Buddhist conception of Karma from the pen of a famous naturalist, see the quotation from Professor Huxley's lecture on "Evolution and Ethics," on page 412 of the present number of *The Monist*.

we prefer to look upon them as altogether different beings. But here the Buddhists will have the advantage. The identity obtains whether it be recognised or not. It is real, for the laws of nature recognise it; it is an established fact. These future incarnations of our Karma inherit our character, together with all its blessings and its curses, in the same way as "I" of to-day am benefited or hampered by my actions from the days of my childhood, it matters little whether I choose to recognise the identity of myself or not.

We can have no proper conception of the action of the moral law until we understand the intercoherence of soul-life. So long as we cut it up into selves, we shall never cease to be puzzled with psychical, philosophical, and moral problems which appear insolvable and incomprehensible.

The great majority of people who consider themselves as orthodox Christians are no doubt believers in the âtman theory of the soul, postulating a self as the agent behind soul-life and looking upon it as the soul proper; yet the great representative authorities of Christian orthodoxy, such men as the Apostle St. Paul, Thomas Aquinas, Eckhart, Tauler, Ignatius Loyola, and many others show strong tendencies to the doctrine of anâtman, or the surrender of the self as the soul proper. We are shocked at the nihilism of the Buddhist whose highest aspiration it is to root out his soul, viz., his âtman or self, in order to attain Nirvâna and become a Buddha, but we take no offence when St. Paul says: "I am crucified with Christ, yet not I but Christ liveth in me."

THE MEANING OF NIRVÂNA.

We have learned that it is as natural as it is erroneous for men exclusively trained in Western modes of thought, to look upon the principal doctrine of Buddhist psychology as a bare and flat denial of the soul. In the same way and for similar reasons it is as natural as it is erroneous for Western minds educated in Christian schools to look upon the Nirvâna of Buddhism as an annihilation, and to characterise Buddhist ethics as quietism.

Nirvâna, the ideal goal of the fully enlightened disciple of Buddha, is the most important term in the religious system of Buddhism;

it is the corner-stone of the whole structure, and yet, judging from the various interpretations of the word and the controversies that have been waged about its meaning, its application must be either very ambiguous, or it contains great difficulties for Western minds.

The common definition of "Nirvâna" among all Buddhists is "deliverance," viz., deliverance from evil, or salvation. The question is, what is the nature of this deliverance?

The etymology of the word is obvious enough. Nirvâna means "extinction," viz., the "extinction of self," which is generally supposed to be the definition of the term given by the Hinayâna school of the old southern Buddhism.* Those representatives of the Mahâyâna school of Japan, however, who visited the World's Parliament of Religions, are wont to describe Nirvâna as "the complete attainment of truth." In their conception, Nirvâna is attained by the extinction of the illusion of self, with all it implies, covetousness, lust, and all sinful desires.

The main issue of all the discussions concerning the term Nirvâna is the problem whether it must be conceived as a positive or a negative state of existence, as an eternal rest or a life in paradise, as a complete annihilation or the bliss of absolute perfection. In order to settle this much mooted question, not by an *a priori* offhand method, but by systematically consulting the old Buddhist authorities, the Professors F. Max Müller and Childers have collected and compared great numbers of passages in which the word Nirvâna occurs, and the result is that "there is not one passage which would require that its meaning should be annihilation," while "most, if not all," would thereby "become perfectly unintelligible."

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* Northern Buddhists make a distinction between Hinayâna or "small vehicle" (viz., of salvation) and Mahâyâna or "great vehicle"; the former is the Southern, the latter the Northern school of Buddhist thought; the former prefers to some extent negative and philosophically strict definitions, while the latter aims at positive and religious expressions; the former represents upon the whole more faithfully the historical traditions of Buddha, while the latter, in their aspiration to extend salvation to the broad masses of mankind, have admitted many fantastical elements. We must add, however, that these contrasts are in reality not so sweeping as they appear in a general formula, and the distinction of the Hinayâna and the Mahâyâna, although very convenient for certain purposes, is admissible only within certain limits.

The proposition has been made that there are several kinds of Nirvâna, but Professor Childers regards this theory as a complete failure; he says:

"An extraordinary error, originating, I think, with Burnouf, and repeated unsuspectingly by several eminent European scholars, has done much to involve the question of Nirvâna in needless doubt and obscurity. It is the belief that there are three degrees of Nirvâna, viz., Nibbâna, Parinibbâna, and Mahâparinibbâna (ordinary Nirvâna, complete Nirvâna, and the great complete Nirvâna). This idea is strangely wide of the truth, for Parinibbâna means merely Nirvâna, or the attainment of Nirvâna, and Mahâparinibbâna means nothing more than the death of Buddha."

Professor Oldenberg states the problem of Nirvâna in the following passage:

"Some have thought to find the answer to this question contained in the word Nirvâna itself, i. e., 'Extinction.' It seemed the most obvious construction that extinction is an extinction of being in the Nothing. But doubts were soon expressed as to the propriety of so summary a disposal of this question. It was quite allowable to speak of an extinction in the case—and the term was most incontrovertibly used by the Indians in the case—where being was not annihilated, but where it, freed from the glowing heat of suffering, had found the path to the cool repose of painless happiness. Max Müller has above all others maintained with warm eloquence the notion of Nirvâna as the completion but not as an extinction of being. His position is, that although later Buddhist metaphysicians have undoubtedly regarded the Nothing as the supreme object of all effort, yet the original teaching of Buddha and the ancient order of his disciples was different: for them the Nirvâna was nothing more than the entry of the spirit upon its rest, an eternal beatitude, which is as highly exalted above the joys, as it is above the sorrow, of the transitory world. Would not, asks Max Müller, a religion, which lands us at last in the Nothing, cease to be a religion? It would no longer be what every religion ought to be and purports to be, a bridge from the temporal to the eternal, but it would be a delusive gangway, which suddenly breaks off and shoots a man, just when he fancies he has reached the goal of the eternal, into the abyss of annihilation."

Professor Rhys Davids sums up his discussion of the meaning of Nirvâna in the following words:

"It is the extinction of that sinful, grasping condition of mind and heart, which would otherwise, according to the great mystery of Karma, be the cause of renewed individual existence. That extinction is to be brought about by, and runs parallel with, the growth of the opposite condition of mind and heart; and it is complete when that opposite condition is reached. Nirvâna is therefore the same thing as

a sinless, calm state of mind; and if translated at all, may best, perhaps, be rendered 'holiness'—holiness, that is, in the Buddhist sense, perfect peace, goodness, and wisdom."

Professor Childers presents us with a careful exposition of the problem in his "Pâli Dictionary," *sub voce* Nibbâna, the Pâli word for Nirvâna. He says:

"The difficulty is this. It is true that many expressions are used of Nirvâna which seem to imply annihilation, but on the other hand, other equally numerous and equally forcible expressions are used which clearly point to blissful existence. Thus Nirvâna is called Freedom from Human Passion, Purity, Holiness, Bliss, Happiness, the End of Suffering, the Cessation of Desire, Peace, Calm, Tranquillity, and so on. How is this discrepancy to be reconciled? I reply, the word *nibbâna* is applied to two different things, first that annihilation of being which is the goal of Buddhism, and secondly, the state of blissful sanctification called *arahatta*, or Arhatship, which terminates in annihilation. This fact at once explains the apparent contradiction.

"At first sight it may appear inexplicable that the same term should be applied to two things so different as annihilation and blissful existence; but I think I am able to show that after all the phenomenon may be easily accounted for. . . . Thus, if we say 'Nirvâna is the reward of a virtuous life,' this may, strictly speaking, mean that annihilation is the reward of a virtuous life; but since annihilation cannot be obtained without Arhatship, the idea that Arhatship is the reward of a virtuous life, inevitably presents itself to the mind at the same time.

"Although expressions like 'extinction is bliss' may sound strange or even ridiculous to us, who have from our earliest infancy been taught that bliss consists in eternal life, to a Buddhist, who has always been taught that existence is an evil, they appear perfectly natural and familiar: this is a mere question of education and association; the words 'extinction is bliss' convey to the mind of a Buddhist the same feeling of enthusiastic longing, the same consciousness of sublime truth, that the words 'eternal life is bliss' convey to a Christian."

Thus we have according to Professor Childers the bliss of Arhatship and the complete extinction of being, one as the cause of the other. The Arhat, on reaching the goal of Nirvâna, ceases to exist as an individual person. He says:

"The doctrine of Buddha on this subject is perfectly explicit; he even predicted his own death. Now, to be the ultimate goal of Buddhism, Arhatship must be an eternal state, for if it be not eternal, it must sooner or later terminate, either in annihilation, or in a state which is not blissful, in either case it is not the goal of Buddhism. But since Arhats die Arhatship is not an eternal state, and therefore it

is not the goal of Buddhism. It is almost superfluous to add that not only is there no trace in the Buddhist scriptures of the Arhats continuing to exist after death, but it is deliberately stated in innumerable passages, with all the clearness and emphasis of which language is capable, that the Arhat does not live again after death, but ceases to exist. There is probably no doctrine more distinctive of Çakya-muni's original teaching than that of the annihilation of being."

This solution appears to be nihilistic; but it seems to me that the complete annihilation of Gautama Siddhartha does not imply the complete annihilation of Buddha. Buddha is said to have entered Nirvâna when he died. Yet at the same time we are told that Buddha had attained Nirvâna already during his life. Indeed, enlightenment and Nirvâna are, among all Buddhists of the Hinayâna as well as the Mahâyâna exact synonyms. Nirvâna, the extinction of the illusion of self, is the condition of enlightenment, or perfect understanding of truth. A Buddha is an ideal construction of a man in whom all error and the consequences of error, desires, and sin, have been abrogated; his will is purified, his thoughts are undimmed by illusions, and his mind consists of a perfect knowledge of truth.

There is among orthodox Buddhists no doubt at all that when a Buddha dies his physical existence is dissolved into its elements; and this dissolution is regarded as a final deliverance of that part of man's nature which is the cause of pain and suffering; but the truth, being that element which constitutes his Buddhahood, remains. The life in the flesh is ended, but the life in Nirvâna continues. Now, as Buddhahood is considered the aim of all evolution of life, while the by-paths of sin and error, which consist in circles of useless migrations, lead us away from our goal, Buddha is praised for having escaped the painful repetition of the course of migrations. A Buddha has reached the goal and has attained eternity. He is reborn into the world of error, only to appear as a teacher to point out to others the escape from illusion, sin, and death.

According to the orthodox Buddhist conception there is no doubt about it that the incarnation of Buddha in the person of Gautama Siddhartha has passed away. Gautama has died and his body will not be resurrected. But Buddha continues to live in the body of the Dharma, i. e., the law or religion of Buddha; and, in so far

as he is the truth, he is immortal and eternal. The whole world may break to pieces, but Buddha will not die. The words of Buddha are imperishable. We read in the "Buddhist Birth Stories" the following remarkable passage which strongly reminds us of Matthew xxiv, 35.* One of the Bodhisattvas, taking the resolution of becoming a Buddha, says:

"The Buddhas speak not doubtful words, the Conquerors speak not vain words,
There is no falsehood in the Buddhas,—verily I shall become a Buddha.
As a clod cast into the air doth surely fall to the ground,
So the word of the glorious Buddhas is sure and everlasting.
As the death of all mortals is sure and constant,
So the word of the glorious Buddhas is sure and everlasting,
As the rising of the sun is certain when night has faded,
So the word of the glorious Buddhas is sure and everlasting.
As the roaring of a lion who has left his den is certain,
So the word of the glorious Buddhas is sure and everlasting.
As the delivery of women with child is certain,
So the word of the glorious Buddhas is sure and everlasting."

Christ, when taking leave of his disciples, comforts them, saying, "Lo I am with you alway even unto the end of the world," and Buddha expresses the same idea when in the hour of his death the Mallas are anxious to behold the Blessed One. Buddha says:

"Seeking the way, you must exert yourselves and strive with diligence—it is not enough to have seen me! Walk, as I have commanded you; get rid of all the tangled net of sorrow;

"Walk in the way with steadfast aim. . . . A sick man depending on the healing power of medicine,

"Gets rid of all his ailments easily without beholding the physician. He who does not do what I command sees me in vain, this brings no profit;

"Whilst he who lives far off from where I am, and yet walks righteously, is ever near me! A man may dwell beside me, and yet, being disobedient, be far away from me." (*Sacred Books of the East*, XIX, pp. 289–290.)

He who knows the truth and leads a life of truth, walking in the eightfold path of righteousness, has attained to Nirvâna and is with Buddha. And this view can only be called nihilism if Truth is an unmeaning word, and if moral aspirations are destructive of life.

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* *Cf.* also Mark xiii, 31; Luke xvi, 17; Luke xxi, 33.

There are many synonyms and explanatory epithets of Nirvâna, among which are such expressions as the Imperishable, the Infinite, the Eternal, the Everlasting, the Supreme, the Transcendent, the Formless, the Void, the Unconditioned, the Goal, the Other Shore, Rest, the True or the Truth. Nirvâna is compared to "an island which no flood can overwhelm," to a "city of peace," the "jewelled realm of happiness," "an escape from the dominion of Mâra," the tempter, or the evil one; and the disciple of Buddha, we are told, will overcome "the world, the world of Yama,* and the world of gods." The Siamese always refer to it as in the phrases "Nirvâna is a place of comfort where there is no care; lovely is the glorious realm of Nirvâna." In Chapter XXVI of the Dhammapada we read:

"When you have understood the destruction of all that was made, you will understand that which was not made."

The most negative term of all the synonyms of Nirvâna is the word "the Void," and its mere existence in Buddhist books appears to favor the nihilistic conception of Buddhism. But what, in that case, shall we make of such expressions as "the voidness alone is self-existent and perfect"? The "abstract" may be a more appropriate translation than "the void," at least it would be less objectionable to those who have devoted themselves to the study of the philosophers of abstract thought.

It is sometimes difficult to understand the reason why an idea such as hollowness or emptiness or voidness, which to us denotes the absence of existence, has become pregnant with meaning in other languages; and we must be careful not to impute the negativism of our speech to the thought of others. Thus we find, on an old palm-leaf manuscript written in Sanskrit and preserved since 609 A. D. in the Buddhist monastery of Horiuzi, Japan, "emptiness" identified with "form";† and that most remarkable philosopher of China, Laou-tze, gives us the key to the probable solution of the problem when he says in "Tâo-Teh-King," XI:

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* The god of Death

† See page 48 in *The Ancient Palmleaves*, edited by F. Max Müller and Bunyiu Nanjio. Appendix by G. Bühler. (Oxford, 1884.)

"The thirty spokes unite in the one nave; but it is on the empty space (for the axle), that the use of the wheel depends. Clay is fashioned into vessels; but it is on their empty hollowness that their use depends. The door and windows are cut out (from the walls) to form an apartment; but it is on the empty space (within), that its use depends. Therefore, what has a (positive) existence serves for profitable adaptation, and what has not that for (actual) usefulness."

Buddha himself abstained from making any positive statements as to the nature of Nirvâna. Whether we call it by positive or negative names is a matter of indifference and does not conduce to holiness. In this sense Buddha answers the question of Mâlukya: "Does the Tathâgata live on beyond death or does he not live on beyond death?" Buddha says:

"If a man were struck by a poisoned arrow, and his friends and relatives called in a skilful physician, what if the wounded man said, 'I shall not allow my wound treated until I know who the man is by whom I have been wounded, whether he is a noble, a Brâhman, a Vaiçya, or Çudra,'—or if he said, 'I shall not allow my wound to be treated until I know what they call the man who has wounded me, and of what family he is, whether he is tall, or small, or of middle stature, and how his weapon was made with which he has struck me.'"

This much is certain, that Buddha, while speaking of the bliss of Nirvâna, denied the continued existence of man's individualised body. Arhatship was eternal to him, but the Arhat dies.

Surrounded by these difficulties and contradictory opinions, let us bear in mind how close the resemblance is between the Buddhist idea of Nirvâna and the Christian hope of Heaven. It has often been remarked that many passages of the sacred writings of Buddhism would remain perfectly intelligible if we replace the word Nirvâna by Heaven. This would, in one respect, be very misleading; Christians cling to the idea that in heaven the personality of the soul is preserved as a separate and discrete entity. The Christian hope of resurrection longs for a preservation of the ego, not of the mind. And on this point Buddhism is very unequivocal. Buddha denies the existence of any soul-substratum, or ego-entity; he rejects the old Brâhmanical doctrine of the âtman, or self, which is said to be the transcendental subject of man's sensations, thoughts, and volitions. But while there is an obvious difference between Nirvâna and Heaven, there is also a close resemblance not only of

allegorical expressions and in descriptions of mystics, but also in the attempt at defining its nature in exact terms. There are some remarkable passages in the New Testament, one of which indicates not less clearly that the final aim of Christ's mission is the obliteration of personality by saying, "that God may be all in all," (I Cor. xv, 28) and this final aim is characterised in the words: "There remaineth therefore a rest for the people of God" (Hebr. iv, 9). Comparing this rest to a great Sabbath the Apostle says: "He that is entered into his rest, he also has ceased from his own works as God did from his. Let us labor therefore to enter into that rest." And Jesus himself says, "Take my yoke upon you . . . and ye shall find rest unto your souls." In the face of these passages we can scarcely say that Christianity regards Heaven as a locality, and when we try to define positively what the orthodox Christian position is, or ought to be, we shall find ourselves implicated in no less intricate historico-philological problems than our Pâli scholars are in their investigations of Nirvâna. When Christian missionaries discovered some Christian color-prints of Jesus and biblical stories in Thibet, the Lama (as we read in Schlagintweit's "Buddhism in Thibet," p. 99) presented to them his view of the Christian salvation, as follows:

"Christianity does not afford final emancipation. According to the principles of their religion, he said, the pious are rewarded with a re-birth amongst the servants of the supreme God, when they are obliged to pass an eternity in reciting hymns, psalms, and prayers in his glory. Such beings, he argued, are consequently not yet freed from metempsychosis, for who can assert that in the event of their relaxing in the duty assigned them, they shall not be expelled from the world where God resides and in punishment be re-born in the habitation of the wretched."

Schlagintweit adds:

"He must have heard of the expulsion of the bad angels from Heaven."

The Lamaistic misconception of the Christian Heaven seems to be analogous to the Christian misconception of the Buddhist Nirvâna. One is quite as excusable as the other.

Schlagintweit says, that "genuine Buddhism rejects the idea of a particular locality being appropriated to Nirvâna," and Nâgasena says to King Milinda, "Nirvâna is wherever the precepts can be observed . . . it may be anywhere." When these passages are com-

pared with the doctrine of Jesus, who says: "The kingdom of God is within you," we should not be astonished to find some mystic Lamas of Thibet declare that since the Christian doctrine of Heaven, according to Christ's own teaching, does not imply the positive existence of a domain somewhere in space, it implies an utter and desolate nihilism.

Schlagintweit* says: "The sacred Buddhist books declare at every occasion that it is impossible positively to define the attributes and properties of Nirvâna." A Thibetan Buddhist scholar might say the same thing to his countrymen in explanation of the Christian conception of Heaven.

If we were to hunt for Christian expressions of Heaven which are similar to the Buddhist similes of Nirvâna, we could find plenty of them, especially in the sermons of the mystics. Those who are inclined to philosophical speculation present the closest approach to a so-called negative formulation: Heaven, not otherwise than Nirvâna, is praised as an utter extermination of self; self disappears in the omnipresence of God, and reappears only as the transfigured standard-bearer of the cause of righteousness.

Whether or not this view is to be regarded as nihilism should be judged from the course of ethics which is derived from it. If Buddhistic ethics are correctly characterised as quietism, we can justly classify its doctrines as nihilism. Now we find that the same objections made by Western people must have been made in Buddha's time by men trained in the schools of Brâhmanism; there is a passage in the Mahâvagga in which Buddha very plainly expounds his view of action and non-action. He admits that he teaches a certain kind of quietism, but he vigorously rejects the quietism of indolence and inactivity. We read in VI, 31, 4:

"Sîha, the general, said to the Blessed One: 'I have heard, Lord, that the Samaṇa Gotama denies the result of actions; he teaches the doctrine of non-action, and in this doctrine he trains his disciples. Now, Lord, those who speak thus, . . . do they say the truth or do they bear false witness against the Blessed One, and pass off a spurious Dhamma as your Dhamma?'"

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*L. c., p. 99.

The answer given by Buddha is as follows:

"There is a way, Sîha, in which one speaking truly could say of me: 'The Samaṇa Gotama denies action; he teaches the doctrine of non-action; and in this doctrine he trains his disciples.'

"And again, Sîha, there is a way in which one speaking truly could say of me: 'The Samaṇa Gotama maintains action; he teaches the doctrine of action; and in this doctrine he trains his disciples.'

"And in which way is it, Sîha, that one speaking truly could say of me: 'The Samaṇa Gotama denies action; he teaches the doctrine of non-action; and in this doctrine he trains his disciples?' I teach, Sîha, the not-doing of such actions as are unrighteous, either by deed, or by word, or by thought; I teach the not bringing about of the manifold conditions (of heart) which are evil and not good. In this way, Sîha, one speaking truly could say of me: 'The Samaṇa Gotama, etc.'

"And in which way is it, Sîha, that one speaking truly could say of me: 'The Samaṇa Gotama maintains action; he teaches the doctrine of action; and in this doctrine he trains his disciples?' I teach, Sîha, the doing of such actions as are righteous, by deed, by word, and by thought: I teach the bringing about of the manifold conditions (of heart) which are good and not evil. In this way, etc."

In the same strain Buddha explains his doctrine of annihilation and contemptibleness, not as an absolute annihilation, but as an annihilation of sin and man's hankering after sin. He says:

"I proclaim, Sîha, the annihilation of lust, of ill-will, of delusion. . . .

"I deem, Sîha, unrighteous actions contemptible. . . .

"He who has freed himself, Sîha, from all conditions (of heart) which are evil and not good, which ought to be burned away, who has rooted them out, and has done away with them as a palm tree is rooted out, so that they are destroyed and cannot grow up again—such a person do I call accomplished in Tapas."* (*Sacred Books of the East*, Vol. XVII, pp. 110, 114.)

Far from preaching quietism, Buddha's sermons, parables, and sentences abound in exhortations to indefatigable and energetic activity. We read in the Dhammapada:

"He who does not rouse himself when it is time to rise, who though young and strong, is full of sloth, whose will and thought are weak, that lazy and idle man will never find the way to knowledge [enlightenment].

"If anything is to be done, let a man do it, let him attack it vigorously."†

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*The literal meaning of Tapas is "burning"; it means self-mortification. Buddha rejects self-mortification and substitutes for it the eradication of all sinful desire.

†*Ibid.*, pp. 68 and 75.

The difficulty to a Western mind in the comprehension of the term Nirvâna lies mainly in our habit of conceiving the nature of the soul in the old Brâhmanical sense of an ego-entity as the doer of our acts, the perceiver of our sensations, and the thinker of our thoughts. In ninety-nine cases out of a hundred, he who denies the existence of that metaphysical being is understood by people educated in our present modes of thought as denying the existence of our soul itself.

Buddha taught the non-existence of the self, and understood by self the âtman of the philosophers of his time. Again and again he inculcates the emphatic injunction that the illusion of self must be overcome. The illusion of self is the secret cause of all selfishness; it begets all those evil desires (covetousness, greed of power, and lust) of which man must free himself. As soon as the illusion of self is overcome, we cease to think of injuring others for the benefit of ourselves.

The Buddhist conception of Nirvâna is most assuredly not the annihilation of thought, but its completion and perfection. We read in the Dhammapada, verse 21 :

"Earnestness is the path of immortality (Nirvâna), thoughtlessness the path of death. Those who are in earnest do not die; those who are thoughtless are as if dead already."

This does not savor of nihilism.

Buddhism is commonly classified as pessimism. This is true in so far as the Buddhist recognises the existence of suffering, but it is not true if by pessimism is to be understood that world-pain which gives up life and the duties of life in despair. Says Oldenberg, speaking of the Buddhist canon :

"Some writers have often represented the tone prevailing in it, as if it were peculiarly characterised by a feeling of melancholy which bewails in endless grief the unreality of being. In this they have altogether misunderstood Buddhism. The true Buddhist certainly sees in this world a state of continuous sorrow, but this sorrow only awakes in him a feeling of compassion for those who are yet in the world; for himself he feels no sorrow or compassion, for he knows he is near his goal which stands awaiting him, noble beyond all else."

The good tidings of Buddha's religion are not so much the

recognition of the existence of pain and care as the conquest of evil and the escape from suffering. The following verses from the Dhammapada have no pessimistic ring :

"Let us live happily then, not hating those who hate us ! Among men who hate us, let us dwell free from hatred !

"Let us live happily then, free from ailments among the ailing ! Among men who are ailing, let us dwell free from ailments !

"Let us live happily then, free from greed among the greedy ! Among men who are greedy, let us dwell free from greed ! "

The Buddhist Nirvâna, accordingly, can only be conceived as a negative condition by those who are still entangled in the illusion of self. Nirvâna is not death but eternal life, not annihilation but immortality, not destruction but indestructibility. Were truth and morality negative, Nirvâna would be negative also ; as they are positive, Nirvâna is positive. The soul of every man continues in what Buddhists call his Karma, and he who attains Buddhahood becomes thereby identical with truth itself, which is everlasting and omnipresent, pervading not only this world system, but all other worlds that are to be in the future. For truth is the same to-day as it will be to-morrow. Truth is the water of life, it is the ambrosia of the soul. The more our mind rids itself of selfishness and partakes of the truth, the higher shall we rise into that domain where all tribulations and anxieties have disappeared, for there sin is blotted out and death conquered.

EDITOR.

LITERARY CORRESPONDENCE.

FRANCE.

THE *Psychologie des idées-forces* will undoubtedly remain M. FOUILLÉE'S definitive work. We meet here again the qualities of the vigorous dialectician, of the eloquent and incisive writer, so prominently displayed in M. Fouillée's previous works, and we remark again the author's intellectual subtlety, his marvellous skill in eluding the objections which apparently he meets, and his great familiarity with the dangerous art of interchanging problems. He has undertaken, however, a work of import and magnitude, which cannot fail to instruct the minds of his opponents on many points. Whether it is absolutely new, whether it marks the outbreak of a revolution in this department of thought, are questions of a different cast. Let us look more closely into the matter, keeping in mind its principal idea.

The great object of M. Fouillée (I have spoken of it before in *The Monist*) is to substitute for the psychology of "representations" a psychology of "actions and reactions." "In every state of consciousness," he says, "there exists always a volition opposed to or in favor of some action, and not simply a form of passive representation." At the bottom of all is "appetition," a dynamical element distinct from the qualitative element, which is the reason that ideas are forces. "The fundamental element, germinal in all living cells, is appetite, accompanied by more or less agreeable or painful emotions, concomitant with this or that motion, and provoking this or that motor reaction."

It is easy to interpret on these principles the facts of reflex mo-

tion, pleasure, pain, memory, etc. I can only point out here the ultimate conclusions to which M. Fouillée leads us, and for the rest we may say that the most interesting feature of M. Fouillée's work is not his psychology, but his metaphysics, taking that word in its best sense.

"A science more advanced than ours," he writes, "will find life everywhere, and with life also mentality to a certain extent, sensation, and appetite; but to reach this stage thinkers must exorcise the ghost of the unconscious." Rather than accept materialism with the dualism which it implies, "it is more logical," he maintains, "to assume that the thinking and willing subject has a mode of action that blends, or is identical, with the fundamental mode of action of objects, and that ideas are the true realities, which in the brain have simply reached a higher state of consciousness. . . . Will, being diffused everywhere in the universe, need only reflect itself progressively upon itself, thereby acquiring greater intensity of consciousness, to become in us sentiment and thought." And again, "the principle destined to dominate psychology will be ubiquity of consciousness and of will under forms more or less rudimentary, but all of which envelop a germ of discernment, a germ of well-being or ill-being, in fine, a germ of preference, and consequently that fundamental process of which the *idée-force* is the highest form."

In fine, appetite is at the bottom of all and is accompanied from the outset with pleasure and pain, with *consciousness*. These are the two facts, or the two hypotheses, about which M. Fouillée masses all his psychological conceptions, combating the idealists in the name of the first, the evolutionists in the name of the second, finally to arrive at a reconciliation of all idealism and naturalism in the conception of the *idée-force*, the *idée-activité*, which will refer to the same physiological unit, will, appetite, and consciousness.

But is it not just as true to say that our representations—our images, that is, the world of perception—mask actions and reactions in the eyes of psychologists? Does not psychology, in fine, when it treats of emotions, pleasure and pain, attention and character, really ascend to this very same primitive fact, here baptised appetite, desire, tendency, and so forth? To say, with M. Fouillée, a reflex ac-

tion is appetitive and not exclusively mechanical, is to insist upon a quality of the phenomenon which is supposed in the mechanism itself. If pleasure and pain become "states of consciousness" it is owing to a property of living matter. And as for memory, the sole fact of the diversity of memories, the foundation of aptitudes, seems to me to imply particular states of that sensibility, or appetite, which M. Fouillée tells us is its principal element. It would seem, then, that we only say what he does when we present states of consciousness as the psychological expression of physiological states, which we declare equivalent. But M. Fouillée's endeavors are directed beyond this point, namely, to reducing the physiological to the psychological, the physical to the mental.

With respect to recognising "life everywhere and with life mentality to a certain extent, sensation, and appetite," this is a mode of conception which does not detract in the least from the validity of previous psychological researches. For even though consciousness exist from the beginning, it is yet necessary to point out the stages of development at which it becomes pronounced and apparent. There is nothing *in esse*, we might say, which was not in the beginning *in potentia*. The interest of science is satisfied with nothing short of a real understanding of the modes by which things pass from potentiality to being, and of a clear exhibition of the genesis and evolution of that "consciousness," whose different states of being are so characteristic. When M. Fouillée speaks of "the permanence and the transformation of the modes of psychical energy," we agree with him. From nothing we can extract nothing. But this surely does not stand in the way of our attempting to discover how a thing originates from something and transforms itself into something, for there is always some additional thing interjected which is an epiphenomenon, or which at least is extraneously displayed and comes to enrich the primitive phenomenon, whatever our central hypothesis may be.

Now, in so far as the hypothesis of M. Fouillée consists of the statement that the thinking and willing subject has a mode of action which blends with the fundamental mode of action of the object (*l'objet pensée*), I do not dispute it, and perhaps up to this point our

whole difference is restricted to a somewhat different method of grouping known facts and of displaying our results. But if we go further and proclaim that ideas and will are the sole realities, the hypothesis assumes a less positive character. It is either Plato or it is Schopenhauer, and this does not exactly satisfy us. We have not a very extensive knowledge of ideas or of will; and we shall abide by our knowledge of our representations and by the feeling of our personal emotions.

The work of M. Fouillée, however, will not have been in vain. It will save us from reaction to materialistic metaphysics and a great many are still in need of this assistance. That which is true and which must be retained is that we do not *explain* consciousness. As soon as we attempt to do it without expressly assuming it, we arrive in some form or other at a noumenon. Herbert Spencer has not avoided this rock, and howsoever more coherent the metaphysics of the *idée-force* is, it also does not deliver us from this difficulty.

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M. Paul Carus gives us a French edition wholly recast of his book *The Soul of Man*, under the new title of *Le problème de la conscience du moi*. The work is too well known to the readers of *The Monist* for me to speak of it in this place. I hope that it will not be without wide influence in our country, and I should be greatly surprised if the spirit of high moral and religious organisation, which inspires all the writings of M. Carus, did not soon attract the attention of many persons in France. For our situation in this respect is a very singular one. With us, psychological research has, especially during the last two decades, constituted nearly all of philosophy. Our reserve on the subject of vast intellectual constructions is extreme, and we have come to a standstill before the barriers of positivism established by August Comte. With regard to the religious problem this reserve amounts almost to indifference. In fact, on this subject we are plunged in an almost incurable scepticism, which has its most pronounced representatives in our real philosophers. The generation of 1848, or at least a small group of that generation, attempted a restoration of liberal Christianism; but that was too much, or, rather, too little. To-day, if religiosity seems to

be renascent, it is only in the decadent literature and only under the color of mysticism. And we cannot expect any efficacious results from troubled spirits and feeble hearts. Our decadents, in fact, only cultivate their egos; they are incapable of broad views, and for the most part are diseased. The men of 1848, on the other hand, started from a just feeling of the social office of philosophy; unfortunately, they were not able to reconstruct it, or to base the religious sentiment, which they imperfectly understood, on a sufficient knowledge of the human soul.

Now, it is precisely with the study of the soul that M. Carus begins, whilst it is only upon psychology, as we have just seen, that M. Fouillée bases his efforts. They both meet in the affirmation of consciousness as a first reality. We should say, accurately, with M. Carus, the state of consciousness, the feeling of living substance. Whatsoever we do, we always grasp things under this point of view, and this is why the monism based on psychology, on the knowledge of the relations of our thought with the external world, with *that* of which we have images, will ultimately be a unitary conception of the world, while the old monistic systems, so called, (a distinction which M. Carus well makes,) are in fact only single-concept philosophies. The philosophies of times gone by bent all their efforts on finding some *single* fact of explanation,—movement, matter, intelligence, etc.,—and they give us thus only *logical* metaphysics. On the other hand it is necessary that a real general explanation should throw no shadow on any of the primordial facts; it should never consist of an arbitrary reduction of the elements of the world to any individual one of these elements.

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And now, while I am on this subject of depicting the public mind of France, I must mention an amiable little book which sends forth a clear angelus-note into the twilight of our beliefs. This little book bears the simple title *Philosophie de poche* (Pocket Philosophy).* Its author is M. Jean Macé, the founder of the "Ligue de l'enseignement" which is preparing the way for a reformation of our schools,

* Published by Hetzel. The other works are published by Félix Alcan.

at present a senator, but by taste still an educator,* one of those rare men who unite with intellectual acuteness common-sense and kindliness, and who take their years without growing old. M. Macé is not the champion of dangerous or fragile novelties. He declares himself religious, without definition. He finds God in the order of the world, and morality in the consciousness which we have of the order of the world. He does not make fine distinctions, and when he strolls into the domain of science, does so, as it were, purely for recreation. Man, he tells us in his summing up, should seek his happiness in the sphere in which his grandeur lies, "in the sentiment of his dignity, in the love of the true which puts him at peace with his reason, and in the love of the good which puts him at peace with his conscience." His God is "that for which mothers have found the name, the naïve personification of the idea of the good, that sweet and simple rule of life which we obey with confidence, which dispenses with all theology." And he adds: "The good God of the little children is still the most philosophical of all, the only one which is not an x. He goes straight to the heart without troubling the mind, in Him is our refuge. If you are not as one of these little children, says the Gospel, you shall not enter into the Kingdom of Heaven."

Surely there is nothing here which will cause violent revolutions in the world, and M. Macé gently gives us perfect freedom without demolishing any traditional barriers. But these simple lessons, these prescriptions of a salutary régime, are worth much more to us in preparing the way for the future than all the negative decrees of vain ignorance.

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I experience a feeling which amounts almost to painfulness when I pass from the book of M. Macé to that of M. Maurice Blondel, *L'action, Essai d'une critique de la vie et d'une science de la pratique.* Far from being so facile and fluent, it is, on the contrary, difficult, and smacks of the school. And all the more pity it is, as its aim is high, and M. Bondel is one of those who could have got

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* I would recommend to educators his *Contes du Petit-Chateau*, real masterpieces, and in a literary point of view superior to most romances.

much useful instruction from the Congress of Religions—that significant feature of your World's Fair.

His thesis consists in justifying the necessity of action and in showing that this conforms to the deepest aspiration of man. "Not being able hitherto," he writes, "to unite action perfectly with thought, nor conscience with science, we have all, both the boor and the philosopher, been obliged to remain like infants, naïvely docile, in the empiricism of duty." Suppose we follow this road; we shall soon see whether we shall have to regret it. But let us also make ourselves, by strict method, participants of the contrary course. For the matter of great importance to us is to know "whether beyond the obscurities through which we must march . . . . whether, amidst all the aberrations of the mind and of the heart, there exist, despite all, the germs of a science and the principles of a profound revelation such that nothing shall appear arbitrary or unexplained in the destinies of each." It is necessary for us to bring face to face with errors, negations, and weaknesses of all sorts, the latent truth on which souls live and of which, perhaps, they die, for all eternity." That latent verity is the supposition of the supernatural, the unconquerable desire for a "saviour," the profound feeling of co-operating with God. And in the thought of M. Blondel the supernatural is given by Christian "revelation." I am very careful when skirting the precipices of dialectics. But the reader may judge for himself. I shall leave him in the vestibule of this work. Criticism can get no hold of matters of faith.

* * *

I find myself restricted to a mere mention of the rather large volume of M. VICTOR DELBOS, *Le problème moral dans la philosophie de Spinoza et dans l'histoire du Spinozisme*, a conscientious study, but somewhat heavy; the excellent book of M. JULES PAYOT, *L'éducation de la volonté;* and *Les lois sociologiques*, by M. GUILLAUME DE GREEF, a Belgian author, known for several other works; *Le droit des femmes dans le mariage, études critiques de législation comparée*, by M. LOUIS BRIDEL of Geneva, where the question of the rights of women is seriously discussed.

I must also refer, with much regret at not being able to speak

at length of it, to the French translation of a work of M. TH. ZIEGLER which has already reached its fourth edition in Germany, entitled *La question sociale est une question morale.* This book is a remarkable one, and we read here with interest of what concerns the difficult problems of socialism, of the perfecting of the social condition of State and Church, of the family, of woman, and so forth. M. Ziegler discovers in this book a clear mind and one which is neither retrogressive nor Utopian.

LUCIEN ARRÉAT.

PARIS.

CRITICISMS AND DISCUSSIONS.

LOGIC AS RELATION-LORE.

REJOINDER TO M. MOURET BY MR. RUSSELL.

The strong and tolerant reply of M. Mouret to my criticisms demands from me my best consideration, not only on account of the ability and courtesy he has shown but also on account of the very important matters that are thus agitated.

I must trespass upon his patience still further, for so far am I from being more at one with him than before, that I fear that that community of view which he believed to exist between us, and which I certainly took to be the case, is in fact much less than either of us have been anticipating.

I. THE NATURE OF MATHEMATICS.

M. Mouret, if I judge him aright, is fully persuaded in his own mind that the mathematicians are lacking in philosophical competency, and are doing little if anything towards the right settlement of the fundamental principles and data of even their own branch of science. I, on the contrary, see in the works of the mathematicians, that which leads me to expect from them, or at least to expect in consequence of what they have accomplished and are going on to accomplish, a new and most illustrious phase in the history of philosophy.

M. Mouret tells us explicitly, that he has occupied himself in analysing the fundamental notions of mathematics, in part, by way of protest against certain doctrines that have the countenance of at least many of the French mathematicians. If I may judge from what I confess to be an altogether inadequate acquaintance with the writings to which M. Mouret refers, I should be inclined to say that he fails to do the men in question the complete justice that the dignity and worth of their work merits. They are, however, men of distinguished ability, and any attempt by me on their behalf would be both officious and presumptuous.

I feel moved, nevertheless, to offer a few words in regard to the question as to the meaning and scope of mathematics. The time is long past when mathematics can with any propriety be defined as the science of quantity. Such is the old

stock definition and no doubt the impression is very generally prevalent tha mathematics is naturally confined within the range where quantity is a prominent feature of the things to be dealt with. But if nothing else than projective geometry and the theories of substitutions and of groups were extant, there would be enough to show that no pent-up region like the region of quantity can confine the powers of mathematics. When, however, we take notice of algebras like "Peirce's Linear Associative Algebra," the various logical algebras, and other very possible algebras that these suggest, and especially when we consult the splendid "Theory of Mathematical Form" of Mr. A. B. Kempe we begin to suspect what I dare say is really the truth that mathematics is the imperial science, whose prime data and original principles must govern the entire range of intellectual exercise.

What then is mathematics? How is it to be defined? No competent answer can be given to these questions until we recognise that the soul of mathematics dwells not so much in the terms or things with which it deals, or even in the static relations, that may obtain in respect thereto as in the *operations* by which these terms or things may be put together or separated and by which the same and said static relations may be altered. Pure mathematics does not even require that all its data and results shall be conceivable, that is, that they shall be of such a nature as to excite in us those mental phenomena that we usually mean when we speak of sensations, notions, concepts, or perceptions. The square root of negative unity, and infinity, the curved, and four or more dimensioned spaces, are mathematical things that we ought not to expect to render (readily at least) into terms of ordinary mentality. Much familiarity with them may in time evoke corresponding mental sensations, perceptions, etc., but until these naturally emerge so as to accredit themselves according to their proper significance, we ought to regard these supra-conceptual things as obtaining in *notation* merely. Indeed it may be more than a fanciful manner of speech to say that in mathematical notation there is being evolved a new supra-intellectual faculty for man.

Mathematics is not, however, by any means lawless, nor is it metaphysical in any bad sense of that term. Variable, indeterminate, and incommensurable are indeed many of its things and functions respectively, but vague or inexact not at all. Even the supra-conceptual things above mentioned are as rigidly ruled by the mathematical constitutions as are all the rest. Nor are the same in any proper sense abstractions or compounded of abstractions. They are the suggestions and the results that have ensued in consequence of the nature of the mathematical *operations*. These have pleaded for what was needed in order to enable mathematics to fill itself out so as to occupy its own proper sphere, and hence the supra-conceptuals have been *recognised* and installed.

In this filling-out of the mathematical sphere as well as everywhere else in mathematics one supreme rule obtains, viz., the rule of *consistency*. No contradictions must be *involved*, but however the data and functions of mathematics are interworked, all must harmoniously co-operate and issue. In point of fact they not

merely do this but they relate and operate together so as to form one harmonious and mutually illuminating whole, in sum and by every detail. It is this that makes mathematics the *beau ideal* and great exemplar for all science and all philosophy.

Mathematics is based upon one original tenet, theorem, faith, or supposition, viz., that this universe of matter, energy, and mind is throughout consistent and reasonable or rather consistent (which *is* reasonable) or reasonable (which *is* consistent).

Another article of the mathematical creed, and one scarcely secondary, is this, There is one absolutely *unique* system of principles consisting of divers operations, relations, notions, and recognitions, which system is necessary and sufficient for the general organisation and explanation of the consistent and reasonable *All*; besides which system, and besides each element and detail of which system, there is naught else either sufficient or necessary for such organisation or explanation; and lacking which system or lacking in certain elements or details of which system, or lacking in some element or detail of which system, such organisation and explanation must proportionately fail. For brevity I will call this system of principles the *organonic* system, and the principles thereof the *organonic* principles.

Now mathematics is that model science or that commonwealth of model sciences, that observes, certifies, and applies the organonic principles, for the improvement of knowledge and belief.

While the question of the genesis of our knowledge of the organonic principles has a decided interest of its own it has little if any relation to their justification. Not how we came by them but what they really *are*, is the important question. Beside the questions as to *what* numerical unity really is, or as to *what* a straight line is, all questions as to how we acquired the notions of these prime data respectively fall into insignificance. We should not discard them even though it should turn out that we acquired them by questionable means. Our title to them is our perception that they naturally belong to us. Just such, too, is our title to the supra-conceptual recognitions. The imaginary unit is known to belong to us not alone by right of adoption, but principally because it exactly fits and fills out the numeric sphere, the other part of which has long been ours. While a knowledge of the genesis of the organonic principles may yield divers suggestions as to the nature thereof, it is nevertheless a knowledge of that nature that we principally need, and this is mainly a matter of observation and criticism.

The recognition and adoption by mathematics of the supra-conceptual entities and the coincident, necessarily implicit transition of the mathematical sovereignty from the passive things with which it deals to its operations, marks, in my judgment, an absolutely new era in mathematics, and through mathematics an absolutely new era in science and philosophy. It stands as a kind of scientific and philosophical Peak of Darien from which we look out on a new ocean for science and philosophy, an ocean palpable and differing in no essential respect from the regions with which we are familiar, but swelling with surges that signify a vastness until now undreamed

of, and yet an ocean for the exploration of which we are, at least in embryo, already furnished.

Here several reflexions push forward. The first is the sovereignty and exigency of the demand for consistency, completeness, unity. Monism is inevitable because nothing less is competent to effect any settlement that will actually settle. Hitherto it has been taken as a prime supposition, and one taken to be so obvious and insuperable that it has never even occurred to any one to challenge the same, that the manifold of *conceivable* things exhausted the data of science and philosophy, and would, could only its hidden organic scheme be once discovered, stand revealed as the all in all. In demand, however, for a unity, a consistency, a wholeness, that could not, nor would, otherwise emerge, and being moreover, as if in duty bound, in obedience to principles long approved as valid and in the highest degree fruitful, to appropriate, in some way, in its scheme certain somewhats that could not be banished, but were ever thrusting themselves forward in its very face and eyes, mathematics at last broke over the charmed circle of conceivable things, recognised and adopted as its own property the so-called *imaginary* data, and instead of finding itself put to absurdity and confusion, found itself, on the contrary, unshackled merely within a renewed, but immensely expanded, world of rigidly consistent verities, that contains the old world as a fragment.

This epoch in the history of mathematics, when its nature is duly appreciated, gives a most momentous lesson to science and philosophy. In philosophy especially we can no longer account the manifold of conceivable things as the all in all, and confine the exercise of our philosophical propensities within its range. We can no longer entertain any rational expectation of finding therein that consistency, completeness, and unity of which we are in search. We can now no more do this than could the old world, after the successful voyages of Columbus and his followers, account the mere eastern continent to be the entire earth, and expect to gain a full and competent knowledge of the earth by studying the geography of that continent only.

The second reflexion that pushes forward is that the true justifications of any sort of dialectic are to be found not so much as we have been wont to think, in the conceivability of things or even in the agreement of thought with things, unless that criterion is better understood and applied than it usually is. True thought does and must agree with things because true thought is only the expression, total or partial, of the organonic principles which pervade thought and things alike. Things, *when truly and adequately interpreted*, exemplify the organonic principles and suggest them to thought. But things may be badly or inadequately interpreted, and yet, owing to their fragmentary nature, there may be a thought, or system of thought, partial or untrue, that will accord with such interpretation. In short, while inconceivability may possibly be an *argument* against a certain thought or quasi-thought, and while the agreement of any assigned thought with things is certainly an argument in favor of the truth of that thought, this inconceivability and this agreement

are both of them uncertain in their significance. There is nowhere any other test of universal application and discriminating authority but that of *general mutual consistency*. This is at once necessary and sufficient to accredit and justify any thought, however inconceivable it may be. If it is said that a thought may, at some one time fully satisfy this criterion so far as can be ascertained, and yet, upon better information, fail therein, I reply, verily such may be the case, but in such a case, however much that thought may swerve from the truth, it will nevertheless mark out and revolve around a verity whose subsequent more exact delimitation it is that reveals the untrue aspect. The criterion laid down by Mr. Spencer, the inconceivability of the contrary, is only one way of stating the criterion of *general mutual consistency*, and is itself subject to the same qualification that has just been stated. The defect of Mr. Spencer's formula dwells in this, that in all that class of cases, by no means rare, in which we can conceive a contrary, we are left without a criterion, unless we say that those ideas are untrue whose contraries are conceivable, a conclusion that is obviously unjustified.

M. Mouret says that the mathematicians with whom he disagrees and whose doctrines served in part as the exciting cause of his essays, "consider mathematics as the science of combinations having for points of departure certain conventions made with numbers independent of reality in general and of the physical magnitudes in particular." If they really do this, they are certainly very loose in their habits of thought. But mathematicians are usually not thus given to looseness of *thinking*, however much they may scatter in their forms of expression. In such recondite regions of discourse as are those in view, there is great need of taking one not exactly and literally as he says, but according to his true intent and meaning, as gathered from his entire context. Says Challis:

"In a passage full of acuteness and good sense, Berkeley ['Theory of Vision,' § cxx] remarks how ill common language is adapted to be the vehicle of uncommon thought, and demands most reasonably that the reader shall strive to follow the thread of his ideas, rather than carp at his language and catch at hitches which the circumstances make inevitable."

I have before me an article by that illustrious French mathematician, M. Poincaré, whom, I take it, is a typical representative of the school of mathematicians that M. Mouret finds so poor in philosophy. In this article, M. Poincaré discourses of the Non-Euclidean Geometry and of axioms, and he does indeed speak of the axioms of geometry as conventions, or as *definitions in disguise*.

The truth is, as it appears to me, somewhat like this: There are real things which may be corporeal things, or relations, or operations; and there are *meanings*, or notions, or ideas; a part of which, at least, may represent real things, and are indeed themselves in a certain sense real; and there are *terms* which are intended to represent, firstly *meanings* and then, in some cases, through meanings, various real things that are not in themselves meanings merely.

Now, besides the various infirmities of terms in themselves, they may be put

together in any way that the mere rules of language permit, and when they are so put together as to form an assertion, there are in any case, two questions that may always arise; first, Is there any meaning expressed? and then, Is this meaning, if any, true or otherwise? In case any assertion is a definition or an attempted definition, it may express, or attempt to express, a status or an operation, or it may suppose or quasi-suppose such a status or operation. In such a case the further very important question may arise. Is this status or this operation one that is possible or *compassable*? If not, then the assertion, supposition, or quasi-supposition has really *no* proper meaning, although unfortunately in too many cases a lack of information or a vague unmathematical habit of mind lures many into the belief that a meaning is contained therein.

But definitions depend upon terms, and by no device of man can they free *meaning* from the trammels and limitations thus entailed, so long as we insist on confining ourselves to the express import of those terms. So insisting, try how we may, we must always at last resolve on some term or terms that shall be taken as known without more ado. Are we, then, tied down to the express import of terms? By no means, else poet and seer must always have gone to their graves undelivered of their burdens so precious to man in all generations. Signs and sign-systems of all sorts have, besides their express import, a *suggestive* power and function, and no signs or sign-systems have, for this behalf, so efficient a power and function, as have terms and language. How often even in the daily intercourse of man does he impart his meaning surely and exactly, nay, even more efficiently, by language that by its express import does not mean as he means, but which frequently, in its literal import, expresses the precise opposite of his real meaning. So in science, even in mathematics. There was never so bald a paradox, according to the express import of the terms used, as to say, "a point is a place without any size whatever," yet it tells the true intent and meaning without any reasonable cause for exception. It is *meanings*, then, that we are after, and terms and language are only so many convenient means towards that end. So far as the axioms and the mathematical points of departure relate to terms and language, they are and must be conventional.

Now, meanings are primarily matters of mental *status*, and, if as to any portions of discourse those who discourse together have the same meanings in the same connexions, or experience mental states that obtain the same in each, in a one-to-one correspondence as to the articulated parts, and in a general correspondence, as to the wholes, then to cavil at calling this a matter of convention, seems to me rather an exercise of logomachy than otherwise.

The truth really is that many of those propositions that are called axioms and many of the mathematical points of departure, are not axiomatical at all. Some of them admit of proof when once the real axioms are ascertained and once the requisite definitions are duly certified. Taking equality as the conjunction of "not more than" and "not less than," the so-called axiom: "Things that are equal to the same thing are equal to one another," may be proved thus.

Put A and B both equal to C. Then A and B are also equal. For A is "not more than" C, and hence C is "not less than" A. A is also "not less than" C, and hence C is "not more than" A. By precisely parallel reasoning, C may be proved to be both "not more than" and "not less than" B. Then A is "not more than" C, which is "not more than" B; hence A is "not more than" B. So, too, A is "not less than" C, which is "not less than" B, and hence, again, A is "not less than" B. A is thus shown to be at once "not more than" and "not less than" B. But to be these is to be equal to B. *Q. E. D.*

There are other so-called axioms that are, as M. Poincaré says, merely definitions in disguise. Such is this one, "The whole is more than any part." Another one that may easily be taken to be very like the last one but which in reality is quite different, is this, "The whole is equal to the sum of all its parts." This is a proposition admitting of a proof that is somewhat lengthy, and that depends upon the definition of "equality," the definitions of "whole" and "part" and the definition of "sum," which definition depends itself upon the prior definition of the operation of addition, the definition of which operation depends again upon the knowledge derived from the actual performance of a problem; that is, from experience.

As above stated the possibility or *compassability* of certain states or operations may be brought into question. In many cases this can be determined affirmatively by actually effecting the state or operation in question. Then we have a problem solved and the corresponding knowledge gained by observation or experiment or whatever it may be called. At any rate by experience.

In other cases divers conditions and circumstances may prevent us from actually effecting the state or operation in question. We cannot go to infinity to try the experiment and see whether we can draw a line that will at once meet another line there and also at some finite point. In another class of cases we have no means of certifying what is the real state of the case. We cannot travel all over space so as to test it, and see if it is everywhere all alike. In still another class of cases we have no means of certifying what may be the real effect of certain of our operations. We cannot tell for certain whether the mere moving of a body around in space does or does not alter it in size or in shape. In all these cases of uncertainty our only resource is to resolve on what we will take to be true, and for the sake of the great convenience this course affords, abide by our resolutions; at least so long as they entail no inconsistency, or contradiction. In order, however, for this course to prove convenient we must agree together expressly or tacitly as to the meanings the propositions shall bear that formulate our resolutions. Such propositions are the only real axioms. All others rest at last upon experience or definitions.

If any one says that such conventions as these are "independent of reality in general," or, if they relate to the physical magnitudes, that they are independent thereof, then if by "independent" is meant independence in any other sense than that that reality or that the physical magnitudes, are silent in respect to the validity

of such conventions, such persons are surely, unqualifiedly, and totally mistaken and deserve even more than the reproaches that M. Mouret has heaped upon them.

II. THE NATURE OF RELATIONS.

After all this long dissertation M. Mouret will surely have excuse to ask how the same is any rejoinder to his reply. I must maintain, however, that it is a rejoinder to the most serious parts of his reply, though made by general rather than by particular remarks.

I cannot admit that I failed to understand him in the main. The root of our disagreement lies in our different views of the nature of relations. As long as this difference remains I do not see how we can arrive at any community of view that would be worth any pains to effect. I said in my paper:

"Now besides the error of confounding relations with relationship it is a very common fault to think and speak of relations as being *between* two or more terms. This imports into thought the thoroughly misleading idea of an intervening independent existence for relations. Relations are attributive predicates of terms, and each one of them pertains strictly to its proper term or combination of terms, in the same sense for this turn (*pro hac vice*) that qualities are held to pertain to their so-called substances," etc.

This conception of relations together with my protest against the common view is almost ignored by M. Mouret. I grant that he conforms himself to the ordinary language as well as to that use of the same that is current in the so-called philosophy; but as a student for a scientific logic, it was on the very account like to that, that I had occasion to make the caution above quoted, and I am not a little nonplussed to find M. Mouret treating the matter in the way he does. If I were the first to discern and employ this notion of a relation, I should, in face of the conduct of M. Mouret, feel great doubt lest I had gone wrong. But since this way of conceiving relations appears to me entirely plain as well as absolutely requisite to a scientific treatment thereof, and since, moreover, in this I only follow the example of DeMorgan and Peirce, and in so far as I am aware, with the single exception of M. Mouret, all the rest of those who in modern times have given any considerable attention to the subject of relations, I naturally feel entirely sure of my ground.

This matter is so fundamental that it calls for defence. Relations, of course, may like other things be of divers sorts; but in so far as they are relations merely, they must be essentially alike. Hence the nature and characteristics that pertain to relations in their most naked estate must continue to pertain thereto in their every form.

I have to say in this connexion that my interest in the views of M. Mouret was mainly enlisted by his conception of logic. I either found in or read into his language a statement of certain somewhat inchoate ideas about fundamentals that had for a long time been ever and anon flitting athwart my mental horizon.

The title "logic" as it is usually employed is made to comprise several very sep-

arable fields of discourse. If such a separation were made and I had the choice on that behalf, I should, for reasons not relevant here, incline to give the old title "logic" to that division that deals with the phenomena of erroneous thinking and its correction, that is, to the doctrine of fallacies. But in that case logic could have no claim to the dignity of being the *scientia scientarum*. Before reasoning, good or bad, can have any occasion to be, the terms and relations upon which it operates must already obtain, and the operations that marshal the same into various arrays and that modify those terms, relations, and arrays in various ways must become extant. Hence the need of an "abstract and objective science that has for its domain the sum total of the exterior objects of knowledge considered independent of their particular nature." I took M. Mouret to mean by "exterior objects" not merely corporeal objects, but everything that bears the insignia of reality, every *fact*, no matter what its nature may be. These, when "*considered independent of their particular nature*," are stripped of every vestige of determination and stand nakedly as so many mere somethings all exactly alike, different indeed as instances but indifferent in all other respects. Corporeal objects, time and all its events, space and all its configurations, numbers, orders, arrays, motions, forces, institutions, etc., etc., and all their evolutions and involutions, etc., etc., remain as a plurality of indifferent instances only.

Now, "can these dry bones move?" Yea, verily. Let but that moving spirit that takes on so many phases, viz., distinction, sundering, denial, etc., etc., and in virtue of which these things "*independent of their particular nature*," obtain as distinct instances, and also the antithesis of that moving spirit, which antithesis also takes on the corresponding antithetical phases, viz., sameness, gathering, affirmation, etc., etc., in virtue of which the said things "*independent of their particular nature*" obtain as copies of one another; let but these continue to operate and subsist, and "form" will evolve in endless luxuriance. Those apparently dependent but really fundamental things that are relations, will at every stage appear as if newly born, and out of this fourfold root, to wit: the original of distinction, etc., the original of sameness, etc., the sense of relation, and the sense of "form" will grow sufficient reasons whereby to explain all experience.

This "form" and its components generate in us certain psychological effects which are not merely full of interest on their own account, but *with their suggestions* form the very occasions for us to perceive "form" and its components.

But these psychological effects, except for the form that may pervade those of them that are complex, are of no moment for science or philosophy. They are ultimate irresolvable facts, and as such only so many "things" to be taken "*independent of their particular nature*" like all the rest. *Mere* psychology, that is to say, psychology less the "form" that it exemplifies, has no instruction to impart that is of any benefit to science or philosophy. These very psychological effects in their turn have been created by and depend upon "form." They depend upon that which we call "mind," or rather that which we call "mind" is the organised (that is "formed") aggregate of these psychological effects. Mind in its turn depends

upon the organised (that is "formed") aggregation of brain-stuff, and the study of this as well as the study of mind is and can be no other than the study of the "form" exemplified therein, and no other or different in its essential nature from the study of "form" in general.

In short, whatever may be the true nature of the universe, whether taken in its corporeal aspect or in its aspects dynamical or mental, and whatever may be our efforts to comprehend the same in detail or in general, it is amenable to our efforts only as a manifold of "things," mere "things"—some undistinguished and some distinguished from some others. This absence of distinction or presence of distinction is throughout governed by relations, and the distribution of these undistinguished and distinguished things and arrays of things throughout the manifold is modulated by those things we call "laws," giving occasion for us to perceive, study and organise the "forms" that variously obtain.

But the universe, in spite of its segregate nature, is also a unitary whole. This obtains in very virtue that it is throughout pervaded by relations and that it belongs to the very nature of relations thus to connect things together. This is insuperably the case, because, to point out a truth by a paradox, (since such is the only way by which it can be expressed,) the very absence of a relation is itself a relation. There is nothing, nor can there be anything "absolute." Each "thing" is related (usually in many ways) to each other thing in the universe. This is not in virtue of any office that knowing beings fulfil, but because such is the nature of the universe. These relations obtain whether any one perceives them or not, and so it is error to think or speak as if the existence or non-existence, in fact, of certain relations were conditioned by what we may do or omit, whether our conduct be physical or mental. In short, and ignoring for this turn the deeper truth that for the behests of science or philosophy relations are the very "stuff" of objects, we may say that by relations the universe of things is knit and re-knit, again and again, in all sorts of ways into a unitary whole, of which the details mutually explain and illustrate each other.

I have said enough, I think, to inform M. Mouret that the logic, science, and philosophy that I favor is throughout "objective" in its nature. M. Mouret will, I trust, pardon me, but it appears to me that he is biassed by a certain phobia he has towards things metaphysical, subjective, introspective, and *a priori*. I am as much the adversary of these when they are uncomprehended or miscomprehended and hence ill employed, as he can possibly be, but I conceive the fault to be not so much those things themselves as a certain spirit, attitude, and method that goes along with the lack of orientation with regard to them. Not so much metaphysics as metaphysicism is the bane of science and philosophy. While we are denouncing all tolerance of "metaphysical entities" some one may ask us what kind of entities are numbers, orders, forces, and the whole brood of entities, complex and less complex, among which mathematics makes its home.

As for *a priori* certitude, the mathematician should be the very last one to dis-

parage its validity or value. It is simple enough in its nature and it results from the truth that the universe is interknit together by a network of relations that taken by certain details are "formal," that is, are "forms," which forms and their respective components are in general susceptible of various definitions. We know that one and one make two for the simple reason that two is no other than what one and one make. We know that two and two make four of absolute necessity at all times, in all places, and under all circumstances, because that which we call four has and can have no other existence than as a member of a certain scale of numbers, formed according to the rule we use in forming the same, and that, according to that rule, which is a rule of operation, four is no other than the result which ensues from taking one and one and one and one together, that is, this operation, or compound of operations, has a certain result as related to the formation of the scale of numbers, and that result is identical with the result that ensues from the doubly compound operation of forming first one two, and then another two, and then lastly taking these two single twos together, and reading the result and giving it its name, according to the names we have before given to our primary scale.

When we make such an affirmation as that two and two make four, we at bottom asseverate, not with respect to objects, but with respect to our own mental operations; in the case stated with respect to the equivalence of the results of certain complexes of our own mental operations. Now, to say, or, with Stuart Mill, to propound, that at some epoch of time, or at some region of space, two and two might make three or five, is not merely to say or propound that at such time or place mental operation might work otherwise than it now does, for that might be, and still consistent results ensue. It is no less than to say or propound that then and there mental operation might exist that would be *inconsistent* in its results, that is, that would be confounding, which is again only to say, that such mental operation would give no *mental* result at all.

A priori certainty, rightly regarded, only involves the faith that the universe is a consistent one, a *reasonable* one; that while, as our experience, or our insight, or our presumptions, may influence us, we may accept or reject, without any logical sin, divers single doctrines, our liberty in general is limited, and we may not accept or reject them by pairs and in other arrays, but *must* often, out of such arrays, hold some doctrines as true and others as false, if we hold any as true or any as false. We cannot, say, hold a triangle to be both scalene and equiangular, nor the circumference of a circle to be just triple its diameter. When, being unsound as to our fundamental notions and doctrines, we yet insist on their truth by authority of that *naïve* intuition that is so unreliable, or by the authority of an incompetent logical faculty, or slovenly logical habits, it is not any *a priori* assurance that we manifest, it is only that false conceit that metaphysicism so generally fosters.

M. Mouret, in spite of his strong lucidity as to some very important points, and in spite of his frequent protests, has not, as it seems to me, wholly escaped from the meshes of metaphysicism. Not to mention other signs of this, his frequent use of

the notion "attribute" calls for notice. "Attribute" is the correlative of "substance" and has no proper sense apart from its correlative. It was the chief intent and import of the work of Berkeley and Hume, on whom M. Mouret so well relies, to abolish this notion of substance. We do not use either of these correlatives, unless it may be by inadvertence or in cases where there is no special call for precision, out of a desire to conform to the language understood by those whom we address. In our fashion of philosophising, one "thing" stands on just the same footing as another. They are all just so many mere "things" of equal original rank.

That "objective and abstract science" of "the sum total of the exterior objects of knowledge considered independent of their particular nature" is Relation-Lore, and because it was this science that I supposed M. Mouret at bottom to intend as his ideal of logic, I entitled my paper "Logic as Relation-Lore."

Since things, merely as so many somethings and nothing more, are the ultimate products of analysis, the science thereof, being the science of everything, (in virtue that everything must be at least a thing,) must be the true *scientia scientarum*, applying in its proper scope, without exception, to everything that has been, or is now, or may possibly be.

It is, in the first place, to be observed that this science is mathematical. It not merely contains the sciences of number and order. The sciences of number and then of order lie at its roots. Pythagoras is said to have laid it down that "number was the first principle of all things." We should be glad to ascertain that that great master had in mind the science that M. Mouret forecasts as his ideal of logic. Order may be "heaven's first law," but in science number is prior to order. Such science of order as is extant takes its very nomenclature from the designations of number.

But, contemporaneous with number and order, relation-lore obtains, and all the essential characteristics of relations are here to be observed. If in such fundamental branches of science as those of number and order that notion of a relation that knows the same as appurtenant to a particular term and not as a betweenness, is imperatively required, then we may be sure that that same notion must universally obtain. This question is easily settled. Take the numerical relation of A to B; say that relation is two. What is it that is two? Is it anything else than A? Is it anything between A and B? In the same case B is in relation to A, that is, it is one-half (not two) of A. What is it that is one half, if not B, and B alone without any betweenness? What is it that is one-half but B, and what is it that is two but A?

Say again, that the relation of A to B is a relation of order, that is, say that B is third in order to A. So stated, the relation is not quite determinate, for A is also in the relation third in order to B, and each is in the relation *from* the other. Yet it is quite plain that A stands to B otherwise than B stands to A. We mark our feeling of this difference by saying that B is third in order *after* A, and that A is third in order *before* B. Now, what is it that is *after* A but B, and what is it that is

before B but *A*? Caution is requisite here, because, though not involved, or, at least, involved only in an incidental way, there is in reality a betweenness, viz.: the thing that occupies the order second. Then, too, if we were dealing with the orders first and second, instead of the orders first and third, our natural associations would tend to drag in the interval or quasi-interval that is usually present in any concrete instance of order. We can escape this error by reflecting that in the latter case the order, in the abstract consideration, is in no wise dependent upon this interval or quasi-interval. We could just as well take this interval or quasi-interval as itself one of the terms of the order. The relations would be the same in either case.

If that which is named *after* is between *A* and *B*, then by that same token that which is named *before* is there also, in which case there is this dilemma: Either the relation "between" *A* and *B* is compounded of contraries, or there are the two relations, *after* and *before*, one pertaining to *B* and the other to *A*.

I respectfully submit that when M. Mouret on proceeding to study the relation of inequality finds himself compelled to give two *senses* to his betweennesses, he virtually yields the whole matter now in issue. Since a *sense*, in the meaning of M. Mouret, is the result of a more ultimate analysis than is a relation, (as he understands the same,) and since all relations, (as he conceives them,) may be regarded either as *senses*, or as compounded of senses, it is hard to see any good reason for his habitudes in respect to the nature of those important entities.

III. M. MOURET'S THEORY OF RELATIONS.

If I have justified the doctrine that I hold with respect to the nature of relations, it follows as a matter of course that M. Mouret labors under disadvantage in framing his theory thereof.

He tells us that his theory takes its true prompting and instruction, not from the axiom of symmetry, as I had supposed, but from the principle of Spencer. I can urge this in excuse, that of all the several maxims akin to it, the axiom of symmetry is the only one that bears any fruitful meaning. M. Mouret, very properly, as I think, insists on the constant recognition of the necessary relativity that must obtain as to all the objects of knowledge. He will have already seen by the foregoing that no one ought more strenuously to insist on such recognition than myself. Indeed, both he and myself are, by our fundamental doctrines, committed to the recognition that all the objects of knowledge are and must be interrelated; that any such case as that of any object of knowledge unrelated is wholly inadmissible, and this naturally, insuperably, and *unconditionally*. We do not evoke the relations by our conduct; they are there *pro re nata*. Now, I hardly know what to understand by an indefinite or by a constant relation. I can easily read into the maxims of Mr. Spencer and George Eliot, in each case, more than one intent, but for no intent that occurs to me can I perceive that either of these maxims are made of any considerable avail. Any two things have by the general case that allows of rela-

tivity at all a definite relation, in this, that they either coexist or they non-coexist, (one case of which non-coexistence is sequence). Just what rôle the definiteness or indefiniteness of the relations of either or both of them to a third thing may fulfil, either in supporting or in ascertaining either one of these definite relations, it is difficult for me to see. With regard to constancy; among all the relations that two things might bear to each other, it would be a singular case that would find them without any constant relation at all, so that again the rôle that the constancy or the inconstancy of the relations of either or both of them to a third thing might fulfil, either in supporting or in ascertaining the existence of an *unassigned* constant relation, is beyond my ability to state. Hence, to lay it down with gravity that "things that have a definite relation to the same thing have a definite relation to one another," or that "things that have a constant relation to the same thing have a constant relation to one another," is only to imply a dependence upon or a contingency upon that which in reality is altogether lacking, so far as we can see, in governing or in instructive efficacy.

The truth is, that after we have recognised the subsistence of universal relativity, it is precisely the ascertaining of the different kinds of relations and the ascertaining of the connexions of these different *kinds* of relations with one another that can alone benefit us to any considerable extent. This is not, as M. Mouret supposes, a matter of psychology, an ascertaining of that which constitutes "the subjective element," but an "objective and abstract" study of "the sum total of the exterior objects of knowledge," and at least in the earlier stages of this study it is very much facilitated by considering them "independent of their particular nature." Hence I must decidedly disapprove of the method of M. Mouret, in selecting a lot of concrete examples for study. It seems to me a useless and needless invitation to error.

I have no special fault to find with the three leading principles laid down by M. Mouret with respect to concepts, save, perhaps, in so far as he claims that the negative of a concept is by any necessity single. I must protest, however, that I cannot agree with him that these three leading principles "cover the entire subject." I do not even see that they are, in essence, new. He may have shown what is undoubtedly true, that many of the concepts of scientific order are composed of less complex elements, but I cannot assent to the proposition that these less complex elements, or even that the most simple thereof, are reducible to "states of consciousness" until I know better what is to be understood by the phrase "states of consciousness"; a phrase, I may add, that is very much overworked. A "state of consciousness" may be taken to mean the "form" expressed therein, or it may mean the various psychological effects, which, as I have before stated, I consider in themselves as both irreducible and valueless for the behests of both science and philosophy. In either case the solution claimed by M. Mouret is obnoxious to the criticism that consciousness grades off continuously into unconsciousness, and, although we may lay it down that every notion or relation ought under analysis of

adequate power to resolve without limit into other notions or relations, we may not say of any status that just emerges over the threshold of consciousness that its elements are primordial. Contrariwise we should expect and hold that our most simple notions and relations depend upon components that are not perceptible or that are sub-perceptible only. All this, however, is the instruction that the introspective method yields. The "objective and abstract" science above mentioned involves no such problems. I must also record my respectful dissent from the claim of M. Mouret that he has pointed out the order and conditions of the derivation of concepts, and that he has described all the conditions for the passage from the known to the unknown.

IV. MATHEMATICAL EQUALITY.

M. Mouret says in his foot-note to section (2) of the paper I criticised: "In the present essay I use the word mathematics to signify exclusively the science of numbers and of quantities, in technical terms the theory of numbers and of mathematical analysis," and his context shows that he expressly excluded geometry, mechanics, physics, chemistry, etc. Hence I took him to mean by "mathematical equality" numerical equality, at least in the main. The gist of what he says upon this branch of our subject in his reply may be comprised in his remark, that equality and inequality are correlative relations, which is entirely true, and in his claim that equality is logically prior to inequality, inequality being defined by equality. In my own paper I advanced an argument designed expressly to show that this was not the case, equality being defined by two correlative inequalities. I can only reiterate my former argument, which as yet remains unanswered. I may say here that I believe I am in accord with many digtinguished logicians in holding that the only propositions that are unconditional in their signification are and must be negative in their form. The remark of Hegel that all determination is by negation is, I believe, well approved as a logical principle.

V. THE AXIOM OF SYMMETRY.

I cannot see that M. Mouret has justified the axiom of symmetry or in any wise parried the thrusts I gave it. Most of his arguments depend upon the validity of his view of the nature of relations. That axiom is stated in an unqualified way, and it asserts no less than that whenever or wherever, no matter how brief the instant or how contracted the region, any two things have the same symmetrical relation to a third thing, that then and there that same symmetrical relation exists between the first two things. Clearly, then, as it seems to me, it was only open to M. Mouret to show as to the instances that I cited, either that the axiom was fulfilled or that my instances were *not* cases of the conjoint existence of a like symmetrical relation between each of two things to a third thing. Now, what kind of an axiom is that, that when the case that it contemplates exists, is sometimes true and sometimes not true? The case of mutual friendship supposes that A and C are mutual friends, coincidently that B and C are also mutual friends. Suppose that this

state of affairs endures for an instant only, then if mutual friendship is a symmetrical relation, and if the axiom is valid, A and B must be mutual friends. I appealed to experience that such was often not the result, and while much that M. Mouret says in avoidance is very true, it does not as it seems to me at all meet the exigency of the case which is very simple, viz.: Does mutual friendship exist between A and B if it exists between A and C and at the same time between B and C? or on the other hand, Is mutual friendship a symmetrical relation?

The case of the distance of two points from a third is made totally irrelevant owing to the different views held by M. Mouret and myself as to the nature of relations. He looks upon a relation as a betweenness, and consequently a distance is to him only a single relation, while I regard the same as the conjunction of two convertible relations.

The case of the sun and two planets is avoided by M. Mouret by the denial that there is in that case any conjunction of relations of mutual equilibrium. He sees in that case only relations of mutual attraction. I cannot stop to dispute over the question of equilibrium. It is a relation that would require much time and space to demonstrate as existing in the case in question in every scientific sense. Instead of that I will take the case of a similar kind to that admitted by M. Mouret; viz., a case of mutual attraction. A and B are bodies charged with positive electricity, and C is a body charged with negative electricity. Hence between A and C there is a mutual attraction, and so is there also between B and C, but instead of A and B attracting one another as by the axiom of symmetry they should, they on the very contrary repel one another. The simple objective verity does not hold.

In order that M. Mouret may not think that I have disregarded his "axiom of the three senses" and what he has to say on its behalf, I make this mention. I must protest that this new axiom is in just as bad a plight as is the axiom of symmetry, but the already too great length of this paper forbids me to enter upon any discussion of the same.

In conclusion I wish to thank M. Mouret for his notice of my criticisms. If in the ardor of advocacy I have been betrayed into any remark that seems to him ungracious, I wish to blot it out and to assure him not formally but really of my distinguished regard.

FRANCIS C. RUSSELL.

BOOK REVIEWS.

NATURAL THEOLOGY. The Gifford Lectures Delivered Before the University of Edinburgh in 1893. By *Prof. Sir G. G. Stokes*, Bart. London: Adam and Charles Black. Chicago: A. C. McClurg & Co. 1893. Pp. 272. Price, $1.50.

The object of Lord Gifford in founding the course of lectures which goes by his name and which is now so widely known, was to promote, advance, teach, and diffuse the study of natural theology in the widest sense of that term, in other words, "The Knowledge of God, the Infinite, the All, the First and Only Cause, the One "and the Sole Substance, the Sole Being, the Sole Reality, and the Sole Existence, "the Knowledge of His Nature and Attributes, the Knowledge of the Relations "which men and the whole universe bear to Him, the Knowledge of the Nature and "Foundation of Ethics or Morals, and of all Obligations and Duties thence arising.' Our readers are probably already acquainted with some of these lectures, all of which we believe have appeared in book-form, and especially with those of Prof. Max Müller, reports of which were published in *The Open Court* several years ago. The last course was delivered by Prof. Sir G. G. Stokes, a physical scientist of great ability, whose work, especially in optics, is celebrated. Unquestionably the views which an eminent practical scientist holds upon the question of Natural Theology should be of great interest, as characteristic of the thought of our time; and in Professor Stokes's case this interest is unusually heightened since his views seem to run counter to the drift of speculation now generally prevailing among physicists.

Professor Stokes's lectures (this is the second course) are divided into two parts: the six lectures which form the first part deal with scientific subjects, in so far as these support the original thesis of Lord Gifford to which the lecturer is limited; the remaining four lectures refer to distinctively Christian doctrines, in so far as these agree with the scheme of natural theology. In the first lecture, Professor Stokes takes up the history of the undulatory theory of light. He shows how we were led to this theory by other natural analogies familiar to us, and how we were gradually obliged to change the suppositions which we originally made and ultimately to assume the existence of certain properties of the ether which we do not meet with in the ordinary course of our experience of things, and which are in some

respects even mysterious; in other words, the properties of the luminiferous ether turned out to be greatly different from what we first thought they were. The conclusion from this is, that if in this physical investigation we had displayed the same stubbornness which we now exhibit in theological [and spiritualistic] investigations, we should have missed great discoveries—discoveries which are now accepted as facts of actual, legitimate science; and consequently that we are much more likely to make mistakes and miss things highly important to our welfare if, relying upon our knowledge of the laws of nature, we summarily dismiss the evidence of asserted facts, which, if true, are of a character to lie altogether outside of the ordinary course of nature. This point excellently characterises the expositions of the lecturer. It leads him to a notion of the supernatural or of events which do not belong to the ordinary familiar course of nature (although the argument really involves only the assumption of things unknown); and to the belief that the instantaneous communication of intelligence from one part of the universe to another is *possible* (Lecture II). It is not necessary to say that Professor Stokes also accepts as evidence of design the adaptedness of organs to their purposes (Lectures III and IV), and that though he accepts evolutionary processes (Lecture V) he yet contends that there is no incompatibility between evolutionary processes and the superposition thereto of occasional creative acts for special purposes (Lecture VI). With respect to the last four lectures we need only mention that the deficiencies which natural theology leaves in the scheme of divine moral government are, in the lecturer's view, in great part supplied by Christianity. It is Professor Stokes's belief that any divorce between natural theology and revealed religion is, in whichever aspect we look at it, to be deprecated.

The point which will claim most the attention of the philosopher or rather epistemologist in Professor Stokes's position is that expounded in the first lecture, namely, to what extent our holding fast to the received truths and ideas of science and to the facts with which we are familiar, will impede the further investigation of nature. His example from the theory of light is a good one, and might be supplemented by a score of others from all branches of science and art. But is Professor Stokes's analysis of this example correct?

The mysterious properties to which Professor Stokes refers are the facts that if the luminiferous ether exists it must at the same time behave like an elastic solid in resisting the gliding of one portion over another, and yet like a fluid in letting bodies pass freely through it. That it exists, Professor Stokes has no doubt. But the existence of nondescript things and their explanation are different matters. Certainly, the discovery of strange things is allowable, but their *explanation* is something which must be effected with reference to known, *familiar* things. This is the case with the above-mentioned property of the ether. It is strange and unfamiliar because it contradicts our ordinary experience, and it will remain such until it is reconciled with the latter. Of course, in this argument it is assumed that this property of the ether is a fact. But epistemologically it is not a fact, but the logical out-

come of an *hypothesis* which we have formed to facilitate our *view* of facts. Such hypotheses, if truly scientific and definitive, must follow what is called the principle of continuity; that is, they must attribute to the hypothetical entities they assume, such properties, and such only, as are not contradicted by our experience of "large" bodies. Perhaps this theory of research is wrong; but it is at least the one which has led to the greatest discoveries—even to the wave-theory of light. The conclusion of it is, not that the nondescript property of the ether referred to is a "great discovery," but rather that there is a very important problem presented here in connexion with the wave-theory of light, which if it cannot be explained *by reference to familiar established facts*, will ultimately render necessary a revision of the undulatory theory of light, in some such sense as took place when transverse vibrations were substituted for longitudinal.

But whether the author's analysis of the point in question is correct or not, the principle which it is used to establish, could be independently affirmed. If it is valid, then the whole history of science has been in vain. After all our struggles we have not really attained a scientific criterion of truth, and scientific criticism is stultified. Professor Stokes's solution of the problem, How shall research be conducted, gives free scope to the wildest vagaries of the spiritualist, and to the ignorant and incompetent of all classes, while it discredits the judgment of the trained critical inquirer and gives to every one, under the pretext of prejudice, the right to impugn the validity of scientific results. T. J. McCormack.

Aspects of Theism. By *William Knight*, LL. D., Professor of Moral Philosophy in the University of St. Andrews. London and New York: Macmillan & Co. 1893. Price, $2.25.

The twelve lectures which constitute this work were delivered at Dundee in 1870, at Salisbury in 1890, and at London in 1891. Its main conclusions were published in 1879 in Professor Knight's "Studies in Philosophy and Literature." The feature of the book is its statement that Theism must be treated as a problem of philosophy. No theory of things, the author justly argues, whether theological, scientific, or historical, which dispenses with philosophy, can have either an adequate basis or a root of endurance. The style of Professor Knight's work is remarkably clear and elegant—an excellence which is surpassed only by the outspokenness of its opinions.

In Professor Knight's view, though the ontological, cosmological, and teleological arguments all possess a germ of truth, each in itself is insufficient. His own argument or solution combines the points of view of *all* thought on this subject; it represents "the theistic view of the Universe as a focus at which the conclusions of "Speculative Philosophy, Science, Poetry, Art, History, and Religion meet—a "focus at which the personal and the impersonal view of the ultimate mystery com-"bine." His argument is full of beauty and charm. But it is more a *feeling* than an argument, and to appreciate fully its strength one must have personal experience

of the moods and sentiments out of which it has grown. That is to say, one might convince oneself by it after one had reached the conviction, but hardly another, who was without it.

Remarking that Professor Knight's favorite term for God is "The Infinite," his argument might be briefly, but brokenly, restated as follows. The proofs of Theism are not philosophically recondite. They do not require any great or original speculative power to comprehend them. They are as patent to the "hewer of wood and the drawer of water" as to the philosopher; so much so in fact that intuitive evidence, above and beyond all other kinds of evidence, is "the impregnable fortress of Theism." He is best fitted for knowledge of God who brings to his task a heart that "watches and receives." There is going on in Nature an incessant apocalypse of the Infinite, which is a real disclosure of God as constant as the sunrise, in the apprehension of which the basis of Theism is laid. We might call this means of knowledge intellectual and moral second-sight. Poets [and, we might add, mystics] possess it in the highest degree. Instead of a conclusion, and this is the very core of Professor Knight's argument, Theism is a *premise* which has other proof than the evidence of ratiocination, and on which the human race carries about with it a vast and many-sided conviction, of which it knows not the evidence, but which is the outcome of momentary illuminations. The Ontologist and the Teleologist, in their pictures of God, unconsciously draw their own portraits; but the Intuitionalist, in his picture of God, only draws the image which he sees and which is revealed to him not as a "form of his mind's own throwing," nor as one due to the penetration of his Finite Spirit, but as an act of "gracious condescension" on the part of the Infinite. Further, and supplementarily, the evidence on which our conviction rests is cumulative. No one individual sees all of God; each sees only a part. Our idea of God is a *heritage of the human race*, to which all nations and all philosophies have contributed their quota. It may be added, also supplementarily, that although no limitations are admissible to circumscribe this idea, yet any epithet may be applied to the Infinite which helps us to understand it, and though we may now describe it as "It" and again as "Thou," yet, since we cannot worship an Impersonal or Absolute Being, we must put ourselves in intelligible relation with the Infinite and regard it not as an abstract essence, but as a real thing, which is best done by conjoining with it the notion of personality; in other words, "Thou" or "He" is preferable to "It."

Philosophically, the Infinite or God of Professor Knight assumes many forms, is in fact everything but the Finite, forming a kind of enlightened Pantheism. In so far as it exhibits itself as a result of the analysis of physical ideas it is a supreme Principle, Force, Essence, Energy, Being, the One beyond the Many, the Essence beneath Appearance, Substance within Phenomena, the Absolute beyond the relative. And as the supreme idea of force is will, this principle is a self-conscious Mind and Will. In this climax of research Metaphysics and Theism unite, and the result is God.

Professor Knight's idea seems to be that the Infinite or God is everything which exists, which is not the Finite, and, we may add, since he is a professed Dualist, it is also a few things which do not exist. The idea of the Infinite in his presentation, regarded as the correlative of the Finite, is the outcome of the doctrine of the relativity of knowledge. From this relation it follows, according to Professor Knight's thinking, that our notion of the Infinite is just as positive as our notion of the Finite; though it is not given us with the luminous clearness that its correlative is, nevertheless it is a real term and a real relation.

There are two kinds of metaphysics. The one which imports its abstract notions into reality, and the other which derives its abstract notions from reality. Professor Knight's reasoning is an instance of the former. He says, the Finite implies the Infinite, as the centre does a circumference, etc., etc. This is true as a *term of thought*, but it is not true as a term of reality. The Infinite as a positive existence follows no more from its correlative "Finite," than the truth of the converse of a logical or geometrical proposition follows from the truth of the proposition. The idea of our real space of three dimensions implies the idea of a space of four or *n* dimensions, but not its existence. Again we may form some notion of what is meant when we speak of infinite magnitude, but what is infinite *quality*? As a fact, we derive our notion of the Infinite from finite things; we have formed it as a help of thought; it is absolutely a negative notion. The fact of its being a correlative of the notion of Finite proves nothing; its nature cannot be deduced from a metaphysical relation, but must be deduced from the facts on the basis of which it was constructed. What "hewer of wood or drawer of water" has a clear notion of the Infinite as a necessity of thought! It is essentially a philosophical, theological, and mathematical idea. In the first two branches it may mean almost anything. In the last only has it been accurately defined and made use of as a real and serviceable idea.

The dualism of man and nature which Professor Knight upholds, when analysed, really indicates the separation of the notions of Finite and Infinite. Suppose, for instance, and the supposition is as allowable as the allegory of personality, that nature, including man, were a great machine in which the motion of one part determined the motions of all the other parts, so that the motion of a part of my brain determined the universe. Would there then be an Infinite? *I* would be God, man, and universe in one. This is an "idealistic" view. But the difficulty is, that the motions of my brain, materially, or spiritually my ideas, my volitions, do not determine the other parts of the universe. They only determine the parts of it which are included within the circumscription of what is termed my self or ego. Beyond it rises the non-ego, the (by me) undetermined part, the universe, the world, God. This undetermined part, compared with "my" determinable part, really is infinite. But why should we view it under the notions of personality, will, etc. One remarkable part of this phase of existence, mind, nature, or whatever it may be called, is, that its conduct is remarkably stubborn and uniform. Stones fall to the ground

fluids seek their level, bodies grow cold, never hot, of themselves. If *I* determined these events, they would often take place differently. Consequently, if there is a mind or will which directs the universe, it is a remarkably single-minded one, and a rigid one, and so much higher than our feeble and wavering will that it would be much better if we should compare ourselves to it rather than make it an image of ourselves.

It only remains to be said that Professor Knight's solution of the problem of the universe is also a henistic one, in the sense in which that word was explained in the last *Monist*. The Infinite or God is a great sea of imperishable, invisible essence, in which man and nature, "all the choir of heaven and the furniture of the earth," float. μκρκ.

THE EVANSTON COLLOQUIUM. LECTURES ON MATHEMATICS. By *Prof. Felix Klein*. Reported by Alexander Ziwet. New York and London: Macmillan & Co. 1894. Pp. 109. Price, $1.50.

One of the most prominent mathematicians who attended the recent Congress of Mathematics at Chicago was Prof. Felix Klein, of the University of Göttingen, Commissioner of the German University Exhibit at the Columbian Exposition. After the adjournment of the Congress, Professor Klein, by special request, held a colloquium on mathematics in the Northwestern University, at Evanston, Illinois. The meetings lasted from August 28 until September 9, during which interval Professor Klein delivered twelve lectures. As the lectures were delivered to members of the Mathematical Congress, they are somewhat in the nature of a supplement to the proceedings of the Congress, which will explain the incompleteness of their character. At the end of the lectures a translation is printed of the historical sketch, "Mathematics at the German Universities," contributed by Professor Klein to the great two-volume work of the German Exhibit, *Die deutschen Universitäten*, mention of which is made in *The Monist* of October, 1893. This sketch brings the subject down to 1870; it is the object of the Colloquium, therefore, to pass in review some of the principal phases of the most recent development of mathematical thought in Germany.

The first six lectures are largely geometrical in character. Lecture I is devoted to Clebsch, whose most valuable work is said to be his generalisation of the whole theory of Abelian integrals to a theory of algebraic functions with several variables; Lectures II and III, to Sophus Lie, whose forte is said to be the application of geometrical intuition to questions of analysis, best expressed in his earliest memoirs. Lecture IV is devoted to "The Real Shape of Algebraic Curves and Surfaces." Professor Klein sets up three chief types of mathematicians, namely: logicians, formalists, and intuitionalists. He classes himself among the third and first. The intuitionalist feature of his mind is exhibited in the present lecture, to the subject of which he has personally contributed much. The characteristics of the geometrical method as discussed in this lecture are that they give an actual

mental image of the configuration under discussion, a feature which Professor Klein considers the most essential in all true geometry. Lecture V is on "The Theory of Functions and Geometry," where an example is given of the general discussion of complex functions by means of geometry.

Lecture VI, "On the Mathematical Character of Space-Intuition, and the Relation of Pure Mathematics to the Applied Sciences," is that of greatest interest to the philosopher and teacher. Professor Klein refers here to his distinction of *naïve* and *refined* geometrical intuition, the first of which is active in all periods of genesis, and the latter in all periods of criticism. For example, the period of Euclid was that of the refined intuition; for his methods are not methods of discovery, but simply methods of confirmation. He applies this distinction to modern mathematical disciplines, and also gives us some excellent remarks on the theory of knowledge and on methods of mathematical instruction. The problem, also, whether the study of mathematics should have wholly utilitarian ends in view is here touched upon, as it is also in Lecture XII. Professor Klein is conscious "of a growing danger in the higher educational system of Germany,—the danger of a separation between abstract mathematical science and its scientific and technical applications." He says, such a separation is only to be deplored; "for it would necessarily be followed by shallowness on the side of the applied sciences, and by isolation on the part of pure mathematics." A comparison of the relative fruitfulness of the mathematics of the eighteenth century, which was developed almost wholly in connexion with practical problems, with that of the nineteenth, will strengthen this view. Still, Professor Klein requests that his remarks be not interpreted as in any way prejudicial to the cultivation of mathematics as a purely disciplinary, abstract science having ends in itself. It may be interesting to our readers to know that Professor Klein recommends Kiepert's new edition (the sixth) of Stegemann's text-book of the Differential and Integral Calculus* as the best work for beginners; and that he regards the second edition of Jordan's *Cours d'analyse* as marked by too much refinement in the laying of the foundations of the calculus to be placed in the hands of a beginner, although for professional mathematicians works like Jordan's are indispensable.

Lecture VII treats of "The Transcendency of the numbers e and π," of Hermite and Lindemann's investigations, with which the readers of *The Monist* are familiar (See *The Monist*, Vol. I, No. 2, p. 227). Lecture VIII treats of "Ideal Numbers," where elementary geometrical interpretations of binary algebraical forms by means of line-lattices, point-lattices, etc., are given. Lecture IX treats of "The Solution of Higher Algebraic Equations"; Lecture X of "Some Recent Advances in Hyperelliptic and Abelian Functions"; Lecture XI of "The Most Recent Researches in Non-Euclidean Geometry." Lecture XII is entitled "The Study of Mathematics at Göttingen"; and as Professor Klein's Göttingen lectures are of spe-

* *Grundriss der Differential- und Integral-Rechnung*, Hannover: Helwing. 1892.

cial interest to American students we shall quote here a statement in connexion with American students to which Professor Klein wishes the widest publicity to be given:

"It frequently happens at Göttingen, and probably at other German universi-
"ties as well, that American students desire to take the higher courses when their
"preparation is entirely inadequate for such work. A student having nothing but
"an elementary knowledge of the differential and integral calculus, usually coupled
"with hardly a moderate familiarity with the German language, makes a decided
"mistake in attempting to attend my advanced lectures. If he comes to Göttingen
"with such a preparation (or, rather, the lack of it), he may, of course, enter the
"more elementary courses offered at our university; but this is generally not the
"object of his coming. Would he not do better to spend first a year or two in one
"of the larger American universities? Here he would find more readily the tran-
"sition to specialised studies, and might, at the same time, arrive at a clearer judg-
"ment of his own mathematical ability; this would save him from the severe dis-
"appointment that might result from his going to Germany."

The spirit of these colloquia make up somewhat for their incompleteness. It would seem as if most of the hearers were quondam students of Professor Klein, as his attitude and tone is that of an old teacher. T. J. McC.

A History of Philosophy, With Especial Reference to the Formation and Development of Its Problems and Conceptions. By *Dr. W. Windelband.* Authorised translation by *James H. Tufts*, Ph. D. New York and London: Macmillan & Co. 1893. Pp. 640. Price $5.00.

There could be no question of the necessity of a translation of Dr. Windelband's "History of Philosophy." The work, which appeared as recently as 1891, met with a very favorable reception in Europe, and possesses many excellences by which it may be favorably compared with the other standard text-books upon this subject. It is not a mechanical re-elaboration of the subject-matter of the history of philosophy, but is based upon many new commendable points of view, both of form and conception. As distinguished from most other manuals of this subject, it gives little space to biographical and bibliographical details, but devotes the main part of its expositions to the presentation of the motives under which our notions of the universe and of life have been developed. This excellence of form has been enhanced by the typographical execution of the translated work, where the matter is so arranged that the student has every advantage that mechanical means can supply, among which we must not omit to notice a good index.

If the reader of this volume is disappointed in some respects, (though there are as many counter-aspects in which he will be pleased,) his disappointment will spring from reasons which the author well defends. Little emphasis has been placed upon the individuality of thinkers, and we miss that inspiration which always attaches itself to the activities of persons. It is what the Germans call a "scientific" exposition, and we may also say it is an *academical* one. This characteristic point of

view of the work will explain the severe criticism which Dr. Windelband makes of books like Lewes's "History of Philosophy," and also of works of the stripe of Dühring's.* All is presented under the point of view of development, and not under that of the individual thinkers. A quotation will suffice to characterise Dr. Windelband's idea.

"Before all else the decisive question is: what has yielded a contribution to "the development of man's conception of the universe and estimate of life? In the "history of philosophy those structures of thought are the objects of study which "have maintained themselves permanent and living as forms of apprehension and "norms of judgment, and in which the abiding inner structure of the human mind "has thus come to clear recognition. This is then the standard, according to which "alone we can then decide also which among the doctrines of the philosophers— "concerning, as they often do, so many various things—are to be regarded as prop- "erly philosophical, and which, on the other hand, are to be excluded from the his- "tory of philosophy. Investigation of the sources has of course the duty of gather- "ing carefully and completely all the doctrines of philosophers, and so of affording "all the material for explaining their genesis, whether from their logical content, or "from the history of civilisation, or from psychological grounds; but the purpose "of this laborious work is yet only this, that the philosophically indifferent may be "ultimately recognised as such, and the ballast then thrown overboard. It is espe- "cially true that this point of view must essentially determine selection and presen- "tation of material in a *text-book*, which is not to give the investigation itself, but "to gather up its results."

Little need be said upon this excellent conception of the History of Philosophy which entirely harmonises with the spirit of modern methods of instruction. The translation appears to be in every respect a faithful and painstaking one. No one who has not done such work can be aware of the difficulties which it presents. As the translator confesses, his success has been an unequal one. And whilst there are some passages which are very idiomatically and smoothly rendered, there are others which bear the marks of a too close and stilted adherence to the original, especially in the rendering of technical terms which the Germans multiply beyond all reasonable limit in their works. The translator has added to the bibliographical lists some English and American works which will be of help to the student, who upon the whole, we think, will find Dr. Windelband's work very serviceable. *μκρκ.*

GRUNDZÜGE DER PHYSIOLOGISCHEN PSYCHOLOGIE. By *Wilhelm Wundt*. Vol II. Leipsic: Wilhelm Engelmann. 1893. Pp. 684.

Shortly after the appearance of the first volume of the fourth edition of Wundt's "Grundzüge der physiologischen Psychologie," we receive the second. This book

* By the way, on page 17, foot-note, Dühring's Christian name is given as "Ed." but should be Eugen. This instructive and versatile philosopher, we regret to say, is also classified on page 630 as a "side phenomenon" along with Hermes, Bolzano, Guenther, and Rosenkrantz.

has acquired the rank of a standard work of reference on this subject, and is too well known to need here a detailed statement of its methods and character. Like all Wundt's works, it is encyclopædic in character, and treats fully of the various extensions of psychological science. Since the appearance of the first edition of the work in 1874, wonderful progress has been made in psychology, and even during the interval which has elapsed between the third and the fourth editions, many changes have been wrought and many new investigations undertaken. Consequently, the present edition is much enlarged, and to give the reader some idea of how great the augmentations have been we will state that while the second volume of the second edition contained but 464 pages, this, the second volume of the fourth edition, contains 684 pages. This increase in size is greatly due to the fact that since that time psychology has developed methods of its own, and perfected technical means of investigation which needed to be explained. Readers will find in Wundt's work full descriptions of all these new methods and instruments, and in this respect may safely rely upon the treatise as the best *Gesammttractat* which exists. *μκρκ.*

STUDIES FROM THE YALE PSYCHOLOGICAL LABORATORY. Edited by *Edward W. Scripture*, Ph. D., Instructor in Experimental Psychology. 1892–1893. New Haven, Conn.: Yale University.

These studies comprise the fruits of the first year's activity of the Yale College Psychological Laboratory. The monographs which the publication contains are: "Investigations in reaction-time and attention," by C. B. Bliss, Ph. D.; "On monocular accommodation-time," by C. E. Seashore; "On the relation of the reaction-time to variations in intensity and pitch of the stimulus," by M. D. Slattery, M. D.; "Experiments on the musical sensitiveness of school-children," by J. A. Gilbert; "A new reaction-key and the time of voluntary movement," by E. W. Scripture and John M. Moore: "Drawing a straight line; a study in experimental didactics," by E. W. Scripture and C. S. Lyman; "Some new psychological apparatus," by E. W. Scripture. The experiments bear the marks of very careful work and are elaborately executed. Descriptions of new psychological apparatus are also included in the volume. *μκρκ.*

SOME LIGHTS OF SCIENCE ON THE FAITH. Eight Lectures Preached Before the University of Oxford in the Year 1892, on the Foundation of the late Rev. John Bampton, M.A., Canon of Salisbury. By *Alfred Barry*, D.D., D.C.L., Canon of Windsor, Late Primate of Australia. London and New York: Longmans, Green, & Co. 1892.

The character of this work may be collected from the restrictions set forth in the following excerpt from Canon Bampton's will, made to provide for the endowment of eight Divinity Lecture Sermons to be given yearly at St. Mary's in Oxford

"I direct and appoint that the eight Divinity Lecture Sermons shall be preached "upon either of the following Subjects—to confirm and establish the Christian "Faith, and to confute all heretics and schismatics—upon the divine authority of

"the holy Scriptures—upon the authority of the writings of the primitive Fathers, "as to the faith and practice of the primitive Church—upon the Divinity of our "Lord and Saviour Jesus Christ—upon the Divinity of the Holy Ghost—upon the 'articles of the Christian Faith, as comprehended in the Apostles' and Nicene Creed."

The lectures embody an attempt "to take some general view of the present relation of Science in its largest sense to the Christian Faith; as illustrated by examples of its bearing, confirmatory, elucidatory, or critical, on the substance of the Creed of Christendom." The author is inclined to a broad optimism on the subject of the reconciliation of science and religion, which, though seeing difficulties, yet sees, or trusts to see, through them. Science, Dr. Barry thinks, is growing more and more alive to the need of correlating its special developments in some large philosophy of Being, and is showing an inclination to acknowledge that the moral insight of the soul is a co-ordinate function with purely intellectual research in discovering the inner secret of that philosophy; while it is also deeply sensible that the search necessarily brings us into the presence of mystery, and forces upon us the alternative of Agnosticism or Faith. The latter alternative is the one for which Dr. Barry contends. The author sets up a "Christian theory of knowledge." The function of science is the discovery of law. And law (this must be pondered) is that which leads to Christ. "The law was our school-master to bring us to Christ, that we may be justified by faith." (Gal. iii, 24.) Why the discovery of law (science) should lead to Christ is stated in some such sentences as this: "We believe that the "Living God, who is Power, Wisdom, Righteousness, Love, has revealed Himself "to His creatures, and that this Revelation is *perfected* [italics are ours] in the "Lord Jesus Christ."

The purpose of all knowledge, or science, thus, is theology, which, unquestionably, is a true doctrine, and philosophically sound, provided we accept the theology which science leads to and do not lead science to the theology which we accept. In this latter sense Dr. Barry's work is strictly scientific, as may be gathered from the fact that he accepts literally the miracles of the New Testament, in the very teeth of what science, i. e. theology, says.

Christian thinkers who are inclined to literalism, will find a variety of new forms of argument, well supporting their position, in this work, which, if we except the technical meanings, with which words of ordinary signification are endowed—a characteristic of theologians—is written in a clear and forcible style and in a profoundly religious spirit. In a mechanical and typographical point of view the work is irreproachable. *μκρκ.*

PRINCIPLES OF POLITICAL ECONOMY. By *J. Shield Nicholson*, M. A., Professor of Political Economy in the University of Edinburgh. New York: Macmillan & Co. 1893. Pp. 434. Price $3.00.

This is a new book, and therein lies much of its value. The author of it had for his instruction all the authorities that preceded him, their precepts, maxims,

reasons and conclusions. In addition to that he has before him all the latest experiments and facts that contradict the theories or prove them. As a teacher of political economy in a great university he has been compelled to study the science well. Those who agree with him will find in this book additional reasons for their faith, and those who differ from him in opinion will find good mental exercise in refuting his arguments. As he remarks in his introduction, the attention which has recently been bestowed upon economic history as will be shown by numerous examples in this work, has led to important modifications of previously accepted theories."

In this work Professor Nicholson explains the principles of political economy in their application to Land, Labor, Wages, Capital, Rent, and all the other subdivisions of the science in language easy to understand, and this is a great merit in a treatise on political economy. The comparison of principles is admirably made, and the illustrations of their practical results drawn from centuries of history are full of information. How far those principles are sound, or in harmony with one another it is for the reader to say. Enough that the principles are there.

The principles of physical science and of moral science are absolute, but not so the political or economic sciences except when they come within the domain of ethics or mathematics. The "laws" of political economy are full of implied provisos and exceptions growing out of artificial and accidental conditions. For instance, Professor Nicholson confidently says, "To assert that successive issues of inconvertible paper, other things remaining the same, will lead to an inflation of prices, is as true as to say that successive applications of heat will expand metals." In that form the statement is true, but many qualifications lie concealed in the proviso "other things remaining the same." It all depends upon the control the seller has over wares. The merchant can raise his prices according to the expansion of the currency, but the man who sells his labor must wait a long time before his wages will rise in proportion to the inflation of the currency in which they are paid. Professor Nicholson's book is valuable, not only for the manner in which it explains the principles of political economy, but also for the historical information it contains.

M. M. T.

UEBER DIE GEWISSHEIT DES ALLGEMEINEN. Vortrag gehalten in der Philosophischen Gesellschaft zu Berlin. By *Dr. A. Von Heydebreck*. Leipsic: C. E M. Pfeffer. 1893.

The author bases the certainty of formal truth, such as that contained in the formula twice two is four, on the impossibility of really *thinking* this process differently. All different thinking of this process, for example, twice two is five, is not a real thinking of the process, but an arbitrary statement of a different process which we do not *think* but only postulate. The universality of this truth, that is, its necessity in the minds of all thinking subjects, is founded on a similar argument namely, that any thinking of this process, by other individuals, which yields a dif-

ferent result, is not a thinking of the process in question but of a different process. The author contends that the facts of consciousness are the sole ultimate data for investigations of formal truth, and that the help of empiricism in the solution of these problems is, as a matter of principle, to be rejected. μκρκ.

DER MODERNE MENSCH. Versuche über Lebensführung. By *B. Carneri*. Third Edition. Bonn: Emil Strauss. 1893.

Our readers will find a somewhat detailed review of this little book of Mr. Carneri's in Vol. I, No. 4, of *The Monist*, page 607. It has now reached its third edition, and has assumed a dress which is in perfect keeping with the beauty and simplicity of its precepts. We know of few works which offer so much ethical food, in so sound and palatable a form. μκρκ.

IL ROMANZO DI UN DELINQUENTE NATO. By *A. G. Bianchi*. German Translation. Berlin: Alfred Fried's Company.

This "Romance of a Born Criminal," a German translation of which has just appeared, is a practical exemplification of Lombroso's theory of criminology, written not by Bianchi, whose name appears on the title-page, but by a real criminal, Antonio M. . . ., now serving a term of sixteen years in an Italian prison for attempted murder. The criminal's real name is withheld out of regard for his family.

It is a remarkable work; and as Antonio M's list of crimes is a long one, his autobiography may be fairly said to be the product of the pen of one who is a perfect embodiment of Lombroso's theories. Despite a very defective education, the author frequently discovers high poetical and literary endowments, so that Bianchi could well write of him: "If he had had the opportunities of an education he would certainly take a place by the side of many of our contemporary writers." The impression of the work is augmented when we find in this "*document humain*," as Bianchi calls it, or rather in this criminal soul, traces of a genuine trust in God and a clearly marked mysticism. Here we find well portrayed that want of capacity of adaptation which Nordau speaks of, and also the same "descants on virtue and honor, patience and humility," that Nordau indicâtes. This criminal himself is not to blame for the "misfortunes" that have overtaken him, but the external world; his crimes are his fate; personally, he always remains in the path of virtue. He sets himself up—this is the purpose of his biography—as a model for his little son Francesco. "Learn from me how to be a man; learn how to suffer without complaining, and to direct thy steps toward the good, the beautiful, and the noble."

Υκ.

DER VERBRECHER IN ANTHROPOLOGISCHER BEZIEHUNG. By *Dr. A. Bähr*. Leipsic: Georg Thieme. 1893.

Although the work just above reviewed is intended as a practical corroboration of Lombroso's doctrines and is regarded by many as an important confirmation of the correctness of his ideas, it must be acknowledged that the general tendency of

present scientific thought is not to accept unqualifiedly Lombroso's main thesis. First, in his work "Crime and Its Causes," and recently in an essay in *Mind*, Morrison has strenuously combated Lombroso's doctrines. The writings of Kurella, which have been mentioned in the German correspondence of previous numbers of *The Monist*, are also on the side of the opposition. So, also, V. Magnan, whose lectures on psychiatry have been recently reproduced in German by P. F. Möbius, (Leipsic: Georg Thieme,) is inclined to qualify Lombroso's position, attributing to the so-called signs of degeneracy only a subordinate importance and maintaining that they are inadequate for the establishment of a type. Finally, it is the expressed purpose of the author of the present voluminous work, Dr. A. Bähr, Chief Physician at the Penitentiary at Plötzensee, to controvert *in toto* the theories of Lombroso.

In the first part of his book, Bähr treats of the physical, and in the second part, of the mental constitution of the criminal, basing his discussions on a long and varied experience, and exhibiting a very extensive knowledge of the literature of the subject. In fact, the reader is placed in this book *au courant* with all that relates to the history and present state of this question. Bähr has only words of praise for Lombroso's great zeal and for the stimulus which has proceeded from his work; but to the positive results of his activities he is absolutely opposed. For example, he says at the close of the chapter on tattooing: "Tattooing stands in no causal connexion whatsoever with atavism, and in much less a degree with criminality. For it appears among criminals solely in consequence of the peculiar character of their conditions of life and their social environment. It cannot be regarded as a sign of criminal tendencies, so long as countless good and honest men exist who are also tattooed." In the third part of the book, which treats of the "born criminal," we read: "We certainly do not go too far when we deny absolutely the existence of a criminal type in an anthropological sense; such a hypothesis lacks every foundation of scientific proof." Bähr goes greatly into details in his discussion of Lombroso's pet idea that both in physical and in mental respects atavism is the key to the mind of the habitual criminal. There is no question but that Bähr's work, which is not only intended for physicians, psychologists, and scientists, but also for the educated lay public, will give rise to much discussion. But it is a question of doubt whether the prophecy of Dr. Derenburg recently made in the Berlin *Tageblatt* will be realised, that Lombroso and his school will find in the communications and discussions of A. Bähr rather a confirmation than a refutation of their doctrines. Υκ.

PERIODICALS.

THE PSYCHOLOGICAL REVIEW. VOL. I. NO. 1 and 2.

PRESIDENT'S ADDRESS BEFORE THE NEW YORK MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION. By *George Trumbull Ladd.*—THE CASE OF JOHN BUNYAN. I. By *Josiah Royce.*—STUDIES FROM THE HARVARD PSYCHOLOGICAL LABORATORY. I. By *Hugo Münsterberg.*—SHORTER CONTRIBUTIONS.

THE PSYCHOLOGICAL STANDPOINT. By *George Stuart Fullerton.*—THE CASE OF JOHN BUNYAN II. By *Josiah Royce.*—COMMUNITY AND ASSOCIATION OF IDEAS: A STATISTICAL STUDY. By *Joseph Jastrow.*—REACTION-TIMES AND THE VELOCITY OF THE NERVOUS IMPULSE. *Charles S. Dolley* and *J. McKeen Cattell.* DISCUSSIONS, ETC.—(New York and London: Macmillan & Co.)

We are glad to welcome into the field of technical literature so promising a periodical as *The Psychological Review.* The *Review* is edited by Prof. J. McKeen Cattell of Columbia College and Prof. J. Mark Baldwin of Princeton University, both of whom are well-known workers in the psychological field. Such eminent writers as Alfred Binet, John Dewey, H. H. Donaldson, G. S. Fullerton, William James, G. T. Ladd, Hugo Münsterberg, M. Allen Starr, Carl Stumpf, and James Sully have promised to contribute, and there is every reason to suppose that the new *Review* will be thoroughly representative. Its external dress is highly tasteful. We wish it all success and hope it will be patronised by readers of *The Monist* who are interested in the more special questions of psychology.

MIND. NEW SERIES, No. 9.

HEGELIANISM AND ITS CRITICS. By *Prof. A. Seth.*—IMITATION: A CHAPTER IN THE NATURAL HISTORY OF CONSCIOUSNESS. By *Prof. J. Mark Baldwin.*—REFLEXIONS SUGGESTED BY PSYCHO-PHYSICAL MATERIALISM. By *Prof. H. Laurie.*—PROF. JAMES'S THEORY OF EMOTION. By *D. Irons.*—DISCUSSIONS, ETC. (London and Edinburgh: Williams & Norgate.)

Prof. Andrew Seth replies to the articles of Professor Jones, published in previous numbers, in criticism of Professor Seth's articles in *The Philosophical Review.* The article contains some excellent comments on epistemology.

Prof. J. Mark Baldwin gives us in the same number a good summary of his work *Mental Development in the Child and the Race,* soon to be published by Macmillan & Company. This work will embody the results of Professor Baldwin's researches into child-psychology, recently conducted with his own children, notes of which have been published in the various periodicals.

THE PHILOSOPHICAL REVIEW. Vol. III. No. 1.

KANT'S THIRD ANTINOMY. By *Dr. W. T. Harris.*—THE RELATION OF METAPHYSICS TO EPISTEMOLOGY. By *D. G. Ritchie.*—GERMAN KANTIAN BIBLIOGRAPHY. By *Dr. Erich Adickes.*—BOOK REVIEWS. (Boston, New York, Chicago: Ginn & Co.)

In *The Philosophical Review*, also Mr. D. G. Ritchie criticises the positions of Professor Seth, who as it is well known argues for the separation of the disciplines of epistemology, psychology, logic, and so forth. Mr. Ritchie says that epistemology is nothing but a part of logic, and that it is only because of the wretchedly limited sense in which the term "logic" has come to be used that there is any excuse for a separate term for the philosophical investigation of the conditions of knowledge. Every phase of this discussion is interesting.

THE AMERICAN JOURNAL OF PSYCHOLOGY. Vol. VI. No. 2.

RHYTHM. By *Thaddeus L. Bolton.*—MINOR STUDIES FROM THE PSYCHOLOGICAL LABORATORY OF CORNELL UNIVERSITY. By *E. B. Titchener.*—AN EXPERIMENTAL STUDY OF SOME OF THE CONDITIONS OF MENTAL ACTIVITY. By *John A. Bergström.*—A NEW ILLUSION FOR TOUCH AND AN EXPLANATION FOR THE ILLUSION OF DISPLACEMENT OF CERTAIN CROSS LINES IN VISION. By *F. B. Dresslar.*—PSYCHIC EFFECTS OF THE WEATHER. By *J. S. Lemon.*—A NEW AND SIMPLE METHOD FOR COMPARING THE PERCEPTION OF RATE OF MOVEMENTS IN THE DIRECT AND INDIRECT FIELD OF VISION. By *F. B. Dresslar*—PSYCHOLOGICAL LITERATURE. (Worcester, Mass.: J. H. Orpha.)

THE NEW WORLD. Vol. II, No. 8.

THE BABYLONIAN EXILE. By *Julius Wellhausen.*—THE PECULIARITIES OF JOHN'S THEOLOGY. By *George B. Stevens.*—PLATO'S CONCEPTION OF THE GOOD LIFE. By *Bernard Bosanquet.*—THE NEW SOCIALISM AND ECONOMICS. By *William B. Weeden.*—THE RELIGION OF THE CHINESE PEOPLE. By *C. De Harlez.*—THE ETHICS OF CREEDS. By *Alfred Momerie.*—HERESY IN ATHENS IN THE TIME OF PLATO. By *F. B. Tarbell.*—THE ETHICAL AND RELIGIOUS IMPORT OF IDEALISM. By *May Sinclair.*—THOROUGHNESS IN THEOLOGY. By *Richard A. Armstrong.*—THE PARLIAMENT OF RELIGIONS. By *C. H. Toy.*—BOOK REVIEWS. (Boston: Houghton, Mifflin & Co.)

INTERNATIONAL JOURNAL OF ETHICS. Vol. IV. No. 2.

THE RELATION OF ETHICS TO JURISPRUDENCE. By *John Grier Hibben.*—MORAL SCIENCE AND THE MORAL LIFE. By *J. S. Mackenzie.*—THE SOCIAL MINISTRY OF WEALTH. By *Henry C. Adams.*—AN ASPECT OF OLD AGE PENSIONS. By *M. J. Farrelly.*—ITALY AND THE PAPACY. By *Raffaele Mariano.*—DISCUSSIONS.—BOOK REVIEWS. (Philadelphia: International Journal of Ethics, 118 S. Twelfth Street.)

VIERTELJAHRSSCHRIFT FÜR WISSENSCHAFTLICHE PHILOSOPHIE. Vol. XVIII. No. 1.

DAS ERKENNTNISSTHEORETISCHE ICH UND DER NATÜRLICHE WELTBEGRIFF. By *R. Willy.*—ANMERKUNG ZU DER VORSTEHENDEN ABHANDLUNG. Ay *R. Avenarius.*—EINIGES ZUR GRUNDLEGUNG DER SITTENLEHRE. (Second Article.)

By *J. Petzoldt.*—Werththeorie und Ethik. (Fifth Article.) By *Chr. Ehrenfels.*—Zur Frage über die Freiheit des Willens. (Concluded.) By *F. Swereff.* (Leipsic: O. R. Reisland.)

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. Vol. VI. Nos. 4, 5, and 6.

Experimentelle Beiträge zur Untersuchung des Gedächtnisses. (Concluded.) By *G. E. Müller* and *F. Schumann.*—Beiträge zur theorie der psychischen Analyse. By *A. Meinong.*

Beiträge zur Theorie der psychischen Analyse. (Concluded.) By *A. Meinong.*—Die monochromatischen Aberrationen des menschlichen Auges. By *M. Tscherning*—Litteraturbericht. (Hamburg and Leipsic: Leopold Voss.)

ZEITSCHRIFT FÜR PHILOSOPHIE UND PHILOSOPHISCHE KRITIK; Vol. CIII. Nos. 1 and 2.

Ueber die letzten Fragen der Erkenntnistheorie und den Gegensatz des transcendentalen Idealismus und Realismus. (First Article.) By *Dr. Edm. Koenig.*—Die philosophischen Schriften des Nikolaus Cusanus. By *Dr. Joh. Uebinger.*—Ueber den Begriff der Erfahrung, mit Rücksicht auf Hume und Kant. By *Robert Schellwien.*

Fr. Jodl's Vortrag über das Naturrecht. By *Ed. Hölder.*—Religionsphilosophisches. By *Theobald Ziegler.*—Zur Aesthetik der Metapher. By *G. Kohfeldt.*—Zur Erinnerung an Hermann Ulrici. By *E. Grüneisen (Halle).*—Recensionen. (Leipsic: C. E. M. Pfeffer.)

REVUE PHILOSOPHIQUE. Vol. XVIII. No. 12. Vol. XIX. Nos. 1 and 2.

La logique sociale des sentiments. By *G. Tarde.*—Sur l'indétermination géométrique de l'univers. By *Calinon.*—Les laboratoires de psychologie expérimentale en Allemagne. By *V. Henri.*

L'abus de l'inconnaissable et la réaction contre la science.—II. La philosophie de la contingence. By *A. Fouillée.*—Observations sur la fausse mémoire. By *Dugas.*—Jacobi et le Spinosisme. By *Lévy-Bruhl.*

Histoire d'une idée fixe. By *Janet (Pierre).*—L'inertie mentale et la loi du moindre effort. By *G. Ferrero.* (Paris: Félix Alcan.)

Professor Delbœuf's articles on physical and geometric space, raising the problem of similar worlds, (see the previous numbers of the *Revue Philosophique* and also the last number of *The Monist,*) seem to have attracted considerable attention among the savants of Europe. M. Delbœuf received numerous private criticisms of his position. Remarks in refutation of it appeared in *Nature*; and in the January (1894) number of the *Revue Philosophique* a rather lengthy examination of his thesis by M. Lechalas appears, appended to which is the answer of Professor Delbœuf. Other criticisms may be expected in subsequent numbers.

It would seem from M. Henri's article on the "Laboratories of Experimental Psychology in Germany" in the December (1893) number of the *Revue Philosophique* that of the thirty laboratories of this science which exist in the world, sixteen, or more than half, are American.

Yours very truly,

Geo. J. Romanes.

VOL. IV. JULY, 1894. NO. 4.

THE MONIST.

THE IMMORTALITY THAT IS NOW.

'TIS said that memory is life,
And that, though dead, men are alive:
Removed from sorrow, care, and strife,
They live because their works survive.
And some find sweetness in the thought
That immortality is now;
That though our earthly parts are brought
To re-unite with all below,
The spirit and the life yet live
In future lives of all our kind,
And, acting still in them, can give
Eternal life to every mind.

The web of things on every side
Is joined by lines we may not see;
And, great or narrow, small or wide,
What has been governs what shall be.
No change in childhood's early day,
No storm that raged, no thought that ran,
But leaves a track upon the clay
Which slowly hardens into man;
And so, amid the race of men,
No change is lost, seen or unseen;
And of the earth no denizen
Shall be as though he had not been.

GEORGE JOHN ROMANES.

GEORGE JOHN ROMANES.

IN MEMORIAM.

GEORGE JOHN ROMANES, the great English naturalist, upon whom, it was said, the mantle of Darwin fell, died on May 23, in the prime of manhood. We are deeply moved at the sad news, and feel his death as our personal loss, for he was not only closely connected with us but had also repeatedly expressed a strong sympathy with the aims of our publications. He contributed articles to both *The Open Court* and *The Monist*, partly in reply to distinguished critics of his works, as F. Max Müller and Alfred Binet, partly as the spirit prompted him to write. Also the American editions of his works "Darwin and After Darwin" and "Weismannism" were brought out by The Open Court Publishing Co. He cordially responded to our call when we asked his aid in bringing out *The Monist*, and the opening article of the first number was from his pen.

Professor Romanes was one of those rare combinations in whose minds a deep religious sentiment and poetical genius are combined with a powerful scientific comprehension. His conviction of "the immortality that is now," is beautifully expressed in the lines published on the first page of this number.* His faith was of a peculiar compass, for his mind was broad enough to harbor, along with a purified Christianity, a philosophy based upon a rigorous investigation of the facts of nature.

EDITOR.

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* They have been selected from a memorial poem addressed to Charles Darwin, embodied in a volume printed for private circulation among his friends.

The frontispiece of the present number is made from a reduction of a large picture which was added in 1892 to the National Portrait Gallery of the British Museum.

THE NON-EUCLIDEAN GEOMETRY INEVITABLE.

IN saying that, at a certain stage of civilisation or general mental enlightenment, the doctrine of the conservation of matter appears of necessity, nothing need be maintained about the finality of that doctrine.

So also in regard to the conservation of energy. When general science and precision of measurement had reached a certain stage of development, a certain perfection, this question of the seeming disappearance of accurately estimated energy could no longer be overlooked. The amount of conscious or unconscious dodging required to avoid this consideration becomes too laborious, and Mayer, Colding, Grove, Helmholtz, Joule, and a host of others find the doctrine of the conservation of energy forced upon them.

Again, without considering as irreducible this foundation-stone of science, we can see that it makes untenable the realistic materialism for which the brain secretes thought as the liver secretes bile; and equally untenable the Scotch realistic dualism of an immaterial soul using the brain.

For suppose all the natural forces of the universe so constituted and connected that one may pass into another in accordance with certain definite ratios of equivalence, such as Joule's mechanical equivalent of heat, but that, so reckoned, they can neither be increased nor diminished as a whole, any more than can the finite amount of matter.

If, now, mind is a piece of the material world; if what we call mental energy, while mental, is yet a part of the sum of physical energy, then some of this invariable quantity of energy exists from time to time as mental energy, and so we would expect to be able to

say that a certain amount of chemical energy disappears, but reappears as mental energy, or perhaps disappears as mental energy but reappears as mechanical energy or heat. But the absolute tests of science would demonstrate that such is never the case. No bit of physical energy ever disappeared as physical energy to become even for an instant mental energy. There is not a single point in the series of changes which take place in the brain at which all the energy is not in actual existence as physical energy. There is not a point where anything of the nature of thought could be inserted as a possible link in the chain of transformations of energy. Materialism and dualism are equally impossible. Idealistic monism becomes inevitable. Thinking mathematicians have long known that number is wholly of human make, and agree that the idea of time has no essential connexion with it. The question of the subjectivity of space is as natural as the question of the actual existence of boundaries. I was an interested listener to a debate, between a chemist and a metaphysician, as to the existence of a boundary between the black and the white half of a surface which was before them. The chemist said he thought of the white part, and then of the black part, but never of anything between them. To him the idea of a boundary absolutely without any breadth, and belonging as much to the white as to the black, appeared highly artificial, and utterly uncalled for. To the metaphysician the common boundary, the line between the white and black, appeared more real than the colors it bounded. The line without width was just what his mind took hold of, and dwelt upon.

Is geometry then as wholly subjective as is arithmetic? It has been a product of pure logic applied to certain fundamental properties attributed primarily to the straight line, secondarily to the plane, circle, and sphere. But whence these properties, these lines, these surfaces? If we can agree upon these will all be settled?

Can any one give a descriptive definition of a straight line or a plane? Euclid's fourth definition is "A line which lies evenly between the points in itself is a straight line." His seventh is "A surface which lies evenly between the straight lines in itself is a plane."

I would paraphrase this: A straight is a line which looks the same from every point not in it. A plane is a surface which looks the same from every point not in it. But for the work of demonstration, Euclid substitutes for his pseudo-description a theorem "Two straight lines cannot enclose a space." We paraphrase this by saying, A straight is a line determined by any two points in it. But just here an interesting question has suggested itself to my mind: "Does not this modern paraphrase fail to touch one tremendously important matter covered by Euclid's Sixth Postulate? [P. Tannery gives as Postulate 6: "*Et que deux droites ne comprennent pas d'espace.*" (Axiom 12 in Gregory; Axiom 9 in Heiberg).]

Space may be homogeneous and boundless (though not infinitely great), and straights may be homogeneous and boundless, and look the same from every point not in them, and each be determined by any two points in it; and yet each may be finite and all may be equal in size. But Euclid's Sixth Postulate assumes in addition that straights are not finite, since if finite and boundless two must recur to any crossing-point, and so would "enclose a space" in Euclid's sense. Did Euclid build so much better than he knew? Or was he conscious of that truth which in modern times waited for Riemann, that space may be boundless, yet finite in size?

When the French Revolution had beheaded all adherence to authority, when even the years and the months were renamed, in the *séance de l'école normale du 26 pluviose an III*, the celebrated Fourier proposed new definitions of the sphere, plane, circle, straight, as foundation for a new treatment of the beautiful science of space.

Take any two points on any solid. Let one remain at rest while the solid moves. The other describes a sphere. Two spheres intersect in a circle. If the spheres are equal and grow, this circle describes a plane. If the spheres touch and one decreases as the other grows, their point of contact describes a straight.

Monge, that delicate spirit, founder of the idea of elegance in demonstration, was present, and suggested certain objections to the views of Fourier, but neither seemed to suspect that these defini-

tions, however perfect, conduct not to Euclidean geometry, but to pangeometry.

How had Euclid managed not only to bury this immortal double-ghost of his space, but to conceal the grave for two thousand years? Euclid did not try to hide the non-Euclidean geometry. That was done by the superstitious night of the fanatic dark ages, from which night we have finally emerged, to find again what Euclid knew.

I believe the Euclid of twenty centuries before the birth of Gauss could still have taught the Gauss of 1799. Let us see. At the end of that year Gauss from Braunschweig writes to Bolyai in Klausenburg as follows:

"I very much regret that I did not make use of our former proximity to find out *more* of your investigations in regard to the first grounds of geometry; I should certainly thereby have spared myself much vain labor, and would have become more restful than any one such as I can be, so long as, on such a subject, there yet remains so much to be wished for. In my own work thereon I myself have advanced far (though my other wholly heterogeneous employments leave me little time therefor), but *the* way, which I have hit upon, leads not so much to the goal which one wishes, as much more to making doubtful the truth of geometry. I have hit upon much which, with most, would pass for a proof, but which in my eyes proves as good as nothing. For example, if one could prove that a rectilineal triangle is possible whose content may be greater than any given surface, then am I in condition to prove with perfect rigor all geometry. Most would indeed let that pass as an axiom; I not; it might well be possible, that, how far apart soever one took the three vertices of the triangle in space, yet the content was always under a given limit. I have more such theorems, but in none do I find anything satisfying."

From this letter we see that in 1799 Gauss was still trying to prove that Euclid's is the only non-contradictory system of geometry, and that it is the system regnant in the external space of our physical experience. The first is false; the second can never be proven. For, strangely enough, though nothing renders it impossible that the space of our physical experience may be this very year satisfactorily shown to belong to Lobatschewsky or to Riemann, yet the same is not true for Euclid. To decide our space is Lobatschewsky's, one need only show a single rectilineal triangle whose angle-sum measures less than a straight angle. A single rectilineal triangle with angle-sum greater than a straight angle would give all

our space to Riemann. And either of these could be shown to exist by imperfect measurements, such as human measurements must always be. For example, if our instruments for angular measurement could be brought to measure an angle to within one millionth of a second, then if the lack or excess in the angle-sum were as great as two millionths of a second, we could make certain its existence.

But to prove Euclid's system, we must show that this angle-sum is *exactly* a straight angle, which nothing human can ever do. Euclid himself tried his own calm, immortal genius, and the genius of his race for perfection, against this angle-sum. The benign intellectual pride of the founder of the mathematical school of the greatest of universities, Alexandria, would not let the question cloak itself in the obscurities of the infinitely great or the infinitely small. He said to himself: "Can I prove this plain, straightforward, simple, if somewhat inelegant theorem: If a straight line meeting two straight lines, make those angles, which are inward and upon the same side of it, less than two right angles, the two straight lines being produced indefinitely will meet each other on the side where the angles are less than two right angles." [Williamson's translation; Postulate 5, P. Tannery and Heiberg, Axiom 11 in Gregory.]

And let not the twentieth-century-American, in the insolence of his newness, underestimate the subtle power of that old Greek mind. The Chicago Fair produced no Venus of Milo. Euclid's own treatment of proportion is found as flawless in the chapter which Stolz devotes to it in 1885 as when through Newton it first gave us our present continuous number-system.

But what fortune had this genius in the fight with its self-chosen simple theorem? Was it found to be deducible from all the definitions, and the nine "Common Notions" and the five other Postulates of the immortal Elements? Not so. But meantime Euclid went ahead without it through twenty-eight propositions, more than half his first book. But at last came the practical pinch, then as now the triangle's angle-sum. He gets it by his twenty-ninth theorem: "A straight falling upon two parallel straights makes the alternate angles equal." But for the proof of this he wants that recalcitrant proposition which has so long been keeping him awake

nights and waking him up mornings. One last struggle, and then, true man of science, he acknowledges it indemonstrable, and spreads it in all its ugly length among his postulates.

But just here the modern translators miss a most charming point. With inartistic dullness, (see, e. g. Todhunter's), they cite in proposition twenty-nine the whole repulsive Postulate 5. But Euclid's delicate genius revolted at the very moment of transcription, and what he actually wrote down was something entirely different and much more elegant, rendered thus by Williamson, 1781: "those [straights] which are produced indefinitely from less than two right angles meet."

The Greek who dared answer to great King Ptolemy, "There is no royal road to geometry," dared carry out for himself the beautiful system of geometry which comes from the contradiction of his indemonstrable postulate; which exists if there be straights produced indefinitely from less than two right angles yet nowhere meeting. Moreover, since Schiaparelli has restored the astronomical system of Eudoxus, and Hultsch has published the writings of Autolycus, we see that Euclid knew surface-spherics, was familiar with triangles whose angle-sum is more than a straight angle.

Of how inevitably the three systems of geometry flow from just exactly the attempt Euclid made, the attempt to demonstrate his postulate fifth, we have a most romantic example in the work of an Italian priest, Saccheri, who died the fifth of October, 1733. He was a Jesuit of San Remo, who commenced to teach at Pavia in 1697, and died at Milan, where he directed the Collegio di Brera. He studied Euclid in the edition of Clavius, where the fifth postulate is given as Axiom 13. Saccheri says it should not be called an axiom, but ought to be demonstrated. He tries this seemingly simple task; but his work on it swells to a quarto book of 101 pages, four pages of index, and forty-eight figures; and with all that, he finds not a demonstration of the postulate, but, instead, three different systems of geometry.

His first proposition is: "I. In a quadrilateral $A\,B\,C\,D$, right-angled at A and B, and with opposite sides $A\,C$, $B\,D$ equal, the angles at C and D are equal." Then, after three more propositions

and three corollaries, he says: "Definitions. There are three hypotheses to distinguish, according to the nature of the angles *C* and *D* in proposition I: *hypothesis anguli recti, hypothesis anguli obtusi, hypothesis anguli acuti.*"

His propositions V, VI, VII are, that if either hypothesis is true in a single case, it is so always.

VIII–IX. In a right-angled triangle the sum of the oblique angles is equal to, greater than, or less than, a right angle, according as the hypothesis is *anguli recti, anguli obtusi, anguli acuti.*

XI–XII. In the first two hypotheses a perpendicular and an oblique to the same straight will meet.

XIII. In these two hypotheses Euclid's Postulate 5 is true.

XV–XVI. According as a triangle's angle-sum is equal to, greater than, or less than, a straight angle, we have *hypothesis anguli recti, obtusi, acuti.*

XVII. With hypothesis *anguli acuti* we can draw a perpendicular and an oblique to the same straight which nowhere meet. (Two solutions given.)

Let this suffice as a specimen of Saccheri's marvellous quarto. Clifford loved the hypothesis *anguli obtusi.* That great astronomer and geometer Sir Robert Ball actually believes in it. But Saccheri, like our profound American mathematician, Professor Oliver of Cornell, was powerfully drawn to the *hypothesis anguli acuti.* He fully realised the momentous consequences involved; nothing less than a new conception of nature, less mechanical than Newton's, and for a Catholic priest beyond question *unorthodox.* "He confessed to a distracting heretical tendency on his part in favor of the *hypothesis anguli acuti,* a tendency against which, however, he kept up a perpetual struggle (*diuturnum proelium*)."

The Inquisitor-general and the Archbishop of Milan saw Saccheri's book on July 13, 1733; the Provincial of the Company of Jesus on August 16, 1733. Within less than two months Saccheri was dead and buried. Not so his book. It was reviewed in the "Acta Eruditorum" in 1736. It was probably in the library at Göttingen about 1790–1800, for it is marked with an asterisk in the "Bibliotheca Mathematica" of Murhard. In this work it is signal-

ised (T. II, p. 43) among the writings consecrated to the explication, to the criticism, or to the defence of Euclid ("Einleitungs- und Erläuterungsschriften, auch Angriffe und Vertheidigungen des Euklides"). It therefore attained a certain notoriety. Did it escape the notice of Gauss? Jacobi, writing to Legendre, accuses Gauss of spreading a veil of mystery over his work.

Now, in the generation just preceding Gauss there worked a person so extraordinary that even Kant calls him "*der unvergleichliche Mann,*"—John Henry Lambert. He was the originator of Symbolic Logic. He fully recognised that the four algebraic operations, addition, subtraction, multiplication, division, have each an analogue in logic, namely, *Zusammensetzung*, *Absonderung*, *Bestimmung*, *Abstraction*, which may be symbolised by $+$, $-$, $\times$, $\div$. He also perceived the *inverse* nature of the second and fourth as compared with the first and third. He enunciates with perfect clearness the principal logical laws, such as the commutative and the distributive. He *develops* simple logical expressions precisely as Boole did later. He interpreted and represented hypothetical propositions precisely as Boole did. In one passage at least he recognised that the inverse process, marked by division, is an *indeterminate* one. Venn says: "To my thinking he and Boole stand quite supreme in this subject in the way of originality."

The problem of the arithmetical quadrature of the circle is as old as mathematics. Lambert it was who first proved the task of the π-computers endless by demonstrating that π is irrational. This alone would have made him immortal. He developed De Moivre's theorems on the trigonometry of complex variables, and introduced the hyperbolic sine and cosine, denoted by the symbols $\sinh x$, $\cosh x$. Now, the development of the theory of complex variables is one of the chief claims of Gauss.

In the very short and imperfect sketch of Lambert by F. W. Cornish of Eton College inserted in the "Encyclopædia Britannica" in 1882 we read:

"In Bernouilli and Hindenburg's *Magazin* (1787–1788) he treats of the roots of equations and *of parallel lines.*"

From the deepest analytical mind of his generation that could only mean the non-Euclidean Geometry. The essay, "Zur Theorie der Parallellinien," was written in September, 1766, but first published in 1786 by F. Bernouilli (a kinsman of John Bernouilli) from the papers left by Lambert, and appears in the *Leipziger Magazin für reine und angewandte Mathematik*, herausgegeben von J. Bernouilli und C. F. Hindenburg, erster Jahrgang, 1786, Seite 137 ff. It is so important that the Leipziger Gesellschaft der Wissenschaften are about to issue a reprint of it in their Abhandlungen.

In this remarkable work Lambert maintains:

1) The Parallel-Axiom needs a proof since it does not hold for the geometry on a sphere.

2) In order to bring before the perceptive intuition a geometry in which the triangle's angle-sum is less than two right angles, we need the help of an "imaginary sphere."

3) In a space in which the triangle's angle-sum is different from two right angles, there is an absolute measure [a natural unit for length].

The rare copies which exist of W. Bolyai's "Tentamen Juventutem," such as that sold by Friedländer in 1884 at 120 marks, are dated 1832–1833. But W. Bolyai, in his "Kurzer Grundriss" (1851) speaks of it as "einem lateinischen Werke von 1829." In this "Latin work" he gives, attributing it to his son John, the expression for a circle in terms of its radius by means of π, e, and this natural unit.

In July, 1831, Gauss, in a letter to Schumacher, gives precisely this formula.

In 1829 Lobatschewsky published the elements of his non-Euclidean geometry in the Kasan *Messenger*.

In 1831 we see Schumacher using the hypothesis "if the geometry of Euclid be not true," and Gauss tells him later that "a certain Schweikardt has given to this geometry the name of *astral geometry*."

In 1846 Gauss writes that he had reread Lobatschewsky's "Geometrische Untersuchungen," and that "the exposition is totally different from that which I had projected."

In this very year Philip Kelland began to teach the non-Euclidean geometry to classes in the University of Edinburgh. In his paper on the subject, read December 21, 1863, before the Royal Society of Edinburgh, he says: "For the last seventeen years I have made it the repeated subject of lectures and essays in my class." Further on he says:

"Some years ago there appeared in *Crelle's Journal* a notice of a work, entitled 'Imaginary or Impossible Geometry,' viz., a discussion of the conclusions which would follow from the assumption as an axiom of the hypothesis that 'the three angles of a triangle are together less than two right angles.' I have never met with any statement of the propositions which the author deduced from this hypothesis."

I take these "some years ago" to be less than "seventeen years," and Kelland to be an independent discoverer of the inevitable non-Euclidean geometry.

Even the newness of America did not prevent our having an independent discoverer of the inevitable, namely, Prof. G. P. Young, the title of whose paper is: "The Relation Which Can Be Proved to Subsist Between the Area of a Plane Triangle and the Sum of the Angles, on the Hypothesis that Euclid's Twelfth Axiom Is False." Read before the Canadian Institute, February 25, 1860. Published in the *Canadian Journal of Industry, Science, and Art*, New Series, Vol. V, 1860, pp. 341–356. He says:

"I propose to prove in the present paper that if Euclid's Twelfth Axiom be supposed to fail in any case, a relation subsists between the area of a plane triangle and the sum of the angles. Call the area A and the sum of the angles s; a right angle being taken as the unit of measure. Then $A = k(2 - s)$; k being a constant finite quantity, that is, a finite quantity that remains the same for all triangles. This formula may be considered as holding good, even when Euclid's Twelfth Axiom is assumed to be true; only k is, in that case, infinite."

J. C. Glashan of Ottawa, Canada, assures us that "this paper was drawn up without the slightest knowledge whatsoever that anything had ever before been written or spoken on the subject."

The proof, which is in the style of Euclid, is thoroughly elementary, even more so perhaps than Bolyai's, and, like his, is applied to but two of the three geometries of space of constant curva-

ture; the assumption of Euclid's Sixth Postulate in the very first proposition, shutting out elliptic geometry. Omitting this proposition, the proof is easily extended to pangeometry.

In 1877 Grassmann pointed out that his "Ausdehnungslehre" of 1844 contained a complete foundation for an analytical development of non-Euclidean spaces. He gives as an example the "spherical space of Helmholtz." He mentions also Riemann's "Probevorlesung" of 1854, of which Dedekind thus describes the effect on Gauss:

"Nun setzte ihn die Vorlesung, welche alle seine Erwartungen übertraf, in das grösste Erstaunen, und auf dem Rückwege aus der Facultäts-Sitzung sprach er sich gegen Wilhelm Weber mit höchster Anerkennung und mit einer bei ihm seltenen Erregung über die Tiefe der von Riemann vorgetragenen Gedanken aus."

Here let us pause. Our thesis is more than established. But of the many who have shown the non-Euclidean geometry *mechanically* inevitable, let me mention just one, that great astronomer and geometer, Sir Robert Stawell Ball, who wrote of late:

"I quite agree with you as to the importance and the interest of the subject. The developments which it suggests are truly astonishing. It is also noteworthy how many mathematicians, approaching the subject from very varied sides, have been led to the study of what mathematics would be like without the eleventh axiom."

And now what is the final outcome, judged from the highest standpoint, that of a pure, fearless philosophy? It is nothing less than a new freedom to explain and understand our universe and ourselves.

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PROF. ADOLF HARNACK ON THE RELIGION OF SCIENCE.

THE *Outlook* of April 28, 1894, contains an article by Prof. Adolf Harnack, entitled "Pro Domo," in which he replies to a review of his "Outlines of the History of Dogma," which appeared under the signature of Merwin-Marie Snell in *The Monist* for January, 1894. The Professor states that "the criticism in *The Monist* gives a fairly detailed account of the contents of the book," but he resents bitterly a few comments which he understands to involve a charge of duplicity. The reviewer remarks that Professor Harnack reverses the pretensions and merits of most other books on religious history. They profess to be impartial, though they are really *ex parte*, while Professor Harnack's work is characterised by an obtrusive affectation of partisanship though in reality it is perfectly fair and judicial. This, in Professor Harnack's interpretation, means "the book is honest, the author is dishonest." Lest any injustice be done to Professor Harnack in the columns of *The Monist*, I have taken the pains to investigate the case. As it is natural that a fearless investigator of ecclesiastical history who professes to be a Christian, will always by his orthodox brethren be accused of equivocation because a faithful believer must, in their opinion, bring into captivity every thought, I can understand the sensitiveness of the Professor on this delicate point, the more so as we learn from an editorial note of the same number of the *Outlook* (pp. 737–738) that he is of a "nervous temperament," but I can assure him that the reviewer, whom I have personally questioned on the subject, had not the slightest intention of throwing the least shadow of doubt upon his honesty.

Professor Harnack, however, does not merely speak *pro domo*, but also makes an assault on the position of *The Monist*: he not only repudiates the supposed charge of hypocrisy but retorts at the same time with an unwarranted attack upon the Religion of Science. I shall discuss his reply not for the purpose of offsetting his *pro domo* by a *pro domo* of mine, but in order to elucidate the problem which is the common object of our investigations. I should be glad to drop all personal matters and confine myself to a brief exposition of Professor Harnack's theology in the light of the Religion of Science, but I trust that a few words of explanation will convince Professor Harnack that the arguments which he supposes to have determined the judgment of his reviewer are inapplicable. Professor Harnack solves the problem which presents itself to his mind, "How did the critic reach the slanderous accusation?" in the following way. He says:

"Simply because he is unable to imagine that a man who candidly examines history can believe in the living God, and find and recognise him in Jesus Christ. To him such faith is absurd, and, hence, it appears inconsistent with sound learning. If, now, he finds in a book sound learning and this faith, he is obliged to conclude that the author, either in the one respect or the other, is a hypocrite. But since one cannot feign sound learning, it must be that the faith is feigned. *Tertium non datur.*"

Before I enter into a discussion of the main subject, which is a comparison of Professor Harnack's theology and the Religion of Science, I wish to make a few personal remarks. The reviewer, Mr. Merwin-Marie Snell, must not be identified with the editorial management of *The Monist*. Our contributors and reviewers are by no means (as Professor Harnack apparently assumes) expected to represent the standpoint of the magazine; they are free men and express their private opinions under their own signature, making the editor, however, in so far coresponsible for what they say, as he accepts their articles for publication. Whether or not Mr. Snell professes the Religion of Science is not for me to say, but judging from a late article of his in the *Non-Sectarian*, I am inclined to think that however much he may be in sympathy with it, he does not make it his own faith. Mr. Snell's position is quite peculiar. Son of a Protestant clergyman, he became a convert to Catholicism and was

for several years secretary to Bishop Keane of Washington. He left the church about two years ago and has of late allied himself with the Unitarians; but while, in agreement with the Religion of Science, he adopts the principle of free investigation, he still cherishes in his heart a peculiar love of Romanism on account of its rites and institutions. Professor Harnack will understand the review better if he considers the character of his reviewer. The very passages of which Professor Harnack complains show traces of Mr. Snell's Catholicism —not of rationalism.

Mr. Snell, like many Catholics, has a grudge against St. Augustine whose theology he regards as a retrogression and as the basis of obscurantism. He believes that the Roman Church allows more freedom than the Lutheran Church and attributes the narrowness of the latter to the influence of St. Augustine. Thus the more he admires the progressive spirit of Professor Harnack, the more is he pained to find Professor Harnack constantly singing the praises of the Latin father. In this sense Mr. Snell says:

"Most thinking men will not partake of the Augustinian and Evangelical sympathies strongly and openly expressed by Dr. Harnack in many places throughout his book; and it is more than questionable whether the Harnack of the closet is in accord with the Harnack of the rostrum."

Mr. Snell means that Professor Harnack's modes of thought are anti-Augustinian while his utterances exhibit an undue overestimation of Augustine. We do not care to decide between Mr. Snell's "Catholic" underestimation of St. Augustine and Professor Harnack's "Evangelical" overestimation; we simply state that (as the context shows in which this paragraph appears) Professor Harnack has misinterpreted the passage.

There is another misunderstanding which rises from the same source. Professor Harnack says:

"Luther did away with the old dogmatic Christianity and put a new evangelical conception in its place. The Reformation is in reality an exit of the history of dogma." (P. 556, Engl. tr.)

There are few Lutherans even now who would assent to Professor Harnack's conception of Lutheranism, and I myself can only agree with Professor Harnack, if he modifies this statement so as

to say that the Reformation introduced into the history of the Church an element which in its further evolution could not but bring about an abolition of dogma. But he must not be blind to the fact that there is plenty of dogmatism in all the Lutheran churches. That Mr. Snell resents Professor Harnack's proposition to lay all the evils of dogmatism at the door of the Roman Church and claim an indemnity for the Lutheran Church, is but natural, although he had better suppressed the remark as to his "suspicion that the history of dogma in the churches of the Reformation is excluded because it is too delicate a subject to be handled with safety under the auspices of the State Church of Germany."* The administration of the State Church of Prussia exercises upon the theological faculties an indirect but strong influence which by no means favors the spirit of free inquiry. That under such conditions German professors are careful in their expressions to avoid all unnecessary offence is but a matter of course. Professor Harnack urges that he personally is untrammelled, "for," says he, "no promise [to defend and teach the Lutheran religion] was exacted from me when I entered the faculty;"† and he adds, that the provision of the Prussian State law is "Science and instruction in science shall be unfettered." As to the latter we know the law and also its execution. It is true that the life, living, and personal liberty of a professor are not endangered, but his activity can be rendered uneffective, he can be spiritually killed, he can even be urged to quit the theological faculty. I need not mention instances for Professor Harnack will know them better than I do; but I know whereof I speak. There is no use in denying the annoyances to which Bible criticism is exposed in Germany. Professor Harnack himself had his full share of them. Nor is there any reason for German theologians to resent a public mention of this

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* Mr. Snell should have said either the several "State Churches of Germany," or "the State Church of Prussia." There is no "State Church of Germany."

† (1) I understand this sentence to mean that "no vow was ever exacted from Professor Harnack." (2) We omit to mention Professor Harnack's remark—that "the faculty is not Lutheran, but a Union of Lutheran and Reformed,"—firstly because we are at present not concerned with the difference between Lutherans and Reformed, and secondly because the Union was made under the explicit stipulation that the confessions of both denominations should remain unaffected.

calamity, for they cannot be blamed for the misapplied paternalism of the ecclesiastical authorities of their country. On the contrary, they must the more be honored. Any one familiar with the situation will join me in expressing my unreserved admiration for the manhood of German theologians who, as a fact, are unrivalled in the wide world for their thoroughness and fearlessness. The flourishing condition of German criticism under externally most unfavorable conditions reminds one of the palm-tree which, when under the pressure of a heavy burden, only grows the statelier and nobler. There is plenty of piety in England and America, but where more than in Germany is piety closely allied with that love of truth which shows itself in an undaunted criticism even of the venerable and dearly beloved sacred writings?

In giving these explanations, I do not mean to say that I should have used Mr. Snell's expressions or that I make them my own; I only elucidate their meaning and the sense in which I want them to be understood. In glancing over his remarks I find several things to which I would take exception.

But now I have to turn the tables and ask Professor Harnack on what ground he imputes to a man whose faith is the Religion of Science the narrowness of regarding all thinkers of a different stamp as "fools or hypocrites"? Professor Harnack demands of a critic "to make an attempt to understand the author's meaning before he tears him in twain." This is good ethics, but does he practise what he preaches? Confusing the reviewer of his book with the editor of *The Monist*, Professor Harnack makes a sally at the Religion of Science. He says:

"I will help my critic a little. According to his idea—and, alas! he is supported in this by some Christians, as we shall see in our second section—the Christian faith appeals to a collection of ancient writings, which are held as sacred and inerrant, to a mass of miracle-narrations, and to a childish conception of the universe and of man. If, now, it is proved that these writings contain errors, that the miracle-narrations are not wholly credible, and that the universe is not such as it was at one time regarded, then faith falls to the ground. Further, the critic is of the opinion that there is a 'Religion of Science,' which can be deduced from an observation of the system of the universe and of the laws of motion; and that this is the only religion. Finally—and this is his chief thought—he believes that all the

phenomena of nature and of history are to be explained through the 'Evolution des Einen' (Evolution of the Monad). I should rejoice if I were mistaken, but I presume that I am not.

"Now, as regards all these doctrines, I hold other views. I believe that the Christian religion still shines just as brightly as formerly, although its books no longer appear inerrant, its miracle-narrations fall, and its old cosmology is destroyed. For the Gospel—that is, the Christian religion—has only *one* aim: that the soul may find its God, and cleave to him in humility and love; and it promises to those who love Jesus Christ, and follow him, that they *shall find God*. Further, a "Religion of Science" is to me a wholly indistinct conception, with which I do not know what to do. I know only of a religion which gives a peace higher than all reason, therefore also higher than all science; and I know only of a religion which is mystically experienced by us, and which receives its confirmation, not from the course of nature, but from conscience and history. Finally, of an 'evolution' I also can speak; but I do not pretend to have found the unity of nature and of spirit, of the realm of gravitation and the realm of moral worth. I believe that they also have their unity; not, however, in an Unknown, but in the living God. However, I can make little use of this faith in the scientific investigation of nature and history. Each of these realms has its peculiar laws. They are deeply involved each in the others; but of what assistance can the science of nature be to me, if I wish to find out to what *persons* our present humanity is most indebted for those powers of faith and conscientiousness, of love and sacrifice, of courage and industry, and when I reflect upon the question as to how these powers are constantly sustained for us? The principle of evolution I also seek to apply wherever its application seems to me possible; but I am not able to include personality and ethics therein, and I am sure that the mysterious Being who rules heaven and earth reveals himself to us in *humanity*. Here he has not left himself without a witness; and from this starting-point I also seek to understand Jesus Christ—the Son of God among the children of God. By my critic this is regarded as an exploded theory of the world. I believe, however, that it more nearly corresponds to the facts which we see about us than does his. In any case, his theory imposes a heavy penalty upon him—he is obliged to regard all who believe in the living God, and find him in history, as either fools or hypocrites. I am in a more favorable position; I hold my opponent to be neither a fool nor a hypocrite, but a misguided man."

Professor Harnack has been bitterly accused in German theological magazines on account of his opinion on the Apostolicum. He was denied the right of calling himself a Christian,* so that I

* It is usually held that a clergyman whose world-conception has broadened under the influence of science must leave the church. We contend that it is his duty to stay. The question is ventilated in an editorial of *The Monist* (Vol. II. No.

wished at the time I could jump to his assistance; and now I find him, in whom I had hoped to find an ally, in full armor against me.

We, the editors of *The Monist*, are in a similar predicament to Professor Harnack. The believer in the letter on the one side decries us as atheistic, while the iconoclast on the other side calls us time-servers, because we continue to use the words God and religion, although in a purified sense and with a deeper meaning.

I am at a loss to account for the sources of Professor Harnack's information concerning the Religion of Science. Mr. Snell's review contains no trace of it. He mentions the Religion of Science once in connexion with the Alexandrian school, but in an indifferent manner. Professor Harnack apparently opens a broadside fire upon the idea of a Religion of Science in general. But why and for what purpose? He fights in the dark. Where can he find in any one of our publications such views on Christianity as he here imputes to the Religion of Science? Let him quote the passage in which the Christian faith has been said to appeal to a childish conception of the universe and of man. The readers of *The Monist* will know how wide of the mark Professor Harnack's comments are; I do not think it necessary to refute them.* Be it sufficient here to say that Religion of Science is not the name of a sect; it does not denote a visible but the invisible church. It characterises a certain religious attitude which may be found among men of various denominations. "Religion of Science" means Religion of Truth, Truth being ascertainable according to the methods of scientific inquiry. Truth being a much misapplied term, the word "science" has been chosen to point out without equivocation the path that leads to truth.

The foundation of the Religion of Science is the principle that it is a sacred duty to investigate the truth with the best means at our disposal, and when it is ascertained, to regulate our conduct

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2, pp. 278–285) entitled "The Clergy's Duty of Allegiance to Dogma and the Struggle Between World-Conceptions."

*The words "Evolution of the Monad" are apparently inserted by the translator and must not be charged to Professor Harnack's account. I do not know where he has found the expression "Evolution des Einen," of which he says "and this is his chief thought"; nor do I know what is objectionable in the phrase. All depends upon the meaning of the word "*des Einen*."

accordingly. Truth is briefly a concise and exhaustive description of fact; a scientific description of facts is what is commonly called "natural law," and natural laws formulate the permanent in the transient, the everlasting in the change, the abiding in that which passes away. An investigation into the nature of natural laws shows that they must be all consistent with one another. There is but one truth, and all various truths are but so many aspects of that one truth. It has been claimed that religious truth can stand in contradiction to scientific truth, and that religious truth is superrational. He who *ex principio* uses a contradiction as the cornerstone of his world conception, builds upon sand. People who cannot gain clearness of understanding naturally resort to such ideas, but they ought to be conscious of the fact that it means a bankruptcy of both their religion and their philosophy. There is no duality in truth. All truth is sacred, all truth is divine, all truth is a religious revelation. Or, in other words, science *is* revelation.

We do not deny that the sacred canon of Christianity is a revelation; we only deny that it is the *only* revelation or the *standard* by which all other revelations must be measured. We reverse the old order of argument; we do not say "Love thine enemy" is a binding injunction because we read it in the Gospel, but we say the spirit of the Gospel is divine because and to the extent that it contains moral truths which are based upon a broad sympathy and a profound comprehension. We must learn to trust in truth, and we must have faith in truth, for faith in truth is the only true religion in the world. If God is not in truth, we had better let God go. If truth does not teach morality, then there is no morality. If truth is unreal, then the world ought not to exist and life would not be worth living.

What shall we say of an inquirer into truth who declares:

"I can make little use of this faith in the scientific investigation of nature and history."

I am grieved to say that the sentence comes from the pen of Professor Harnack. Professor Harnack, a leader among the most competent, who has so vigorously and boldly applied "his faith in the scientific investigation of history," comes and says he can make little use of it. I fear to repeat Mr. Snell's words, that it is "more

than questionable whether the Harnack of the closet is in accord with the Harnack of the rostrum," lest Professor Harnack might again misunderstand the meaning of the words. But it seems to me clear that Professor Harnack in his study follows the injunctions of the Religion of Science, but when he appears before the public he denounces it as useless.

This is no charge of hypocrisy, but of inconsistency, and I am open to conviction. Truly Professor Harnack's "sound learning is not feigned," but it is, by some inadvertence, just a little twisted. Professor Harnack is not clear concerning the philosophical basis of his religious conceptions; therefore, "the idea of a Religion of Science is to him a wholly indistinct conception." He lives up to the ethics of a religion of science in the sanctum of his study, where he moves within the boundary lines of his specialty, but as soon as he enters the sanctissimum of his heart his faith in truth fails him, and he surrenders every attempt to throw the light of science into the wondrous depths of the human soul. He says: "I know only of a religion which is mystically experienced by us." If Professor Harnack would but be consistent, he would apply right here the principle of investigation, and all the clouds of his mysticism would disappear.

It is the office of science, i. e., of clearly presented truth, to dispel mysticism; but understand me rightly: In saying this, I do not advocate the eradication of mysticism, or mean to denounce it as obscurantism. Mysticism is a very important element in the structure of the human soul; and it is the path to truth upon which religion travels—indeed, it is, so far as I can see, the only path upon which the religious evolution of mankind can take place. When comparing science with religion, we are, in consideration of the conservative attitude of our theologians, inclined to say that science is in advance of religion. This is true in many respects, but not concerning the main issues of religion. In the recognition of moral truths, religion has anticipated the results of scientific inquiry. The great religious teachers of mankind have, with a prophetic insight into the nature of things, so to say, by a religious instinct, proclaimed truths which the sages of their times were unable to resolve

or account for. Science must catch up with religion and must learn to decipher the grand utterances of Jesus of Nazareth, and to do this is the sole object of all theological scholarship and of the philosophy of religion. Many are diffident and say it cannot be done, but we say it must be done; man's rational nature impels him to do it; and it is his highest duty to understand the nature of his religious ideals.

The great facts of history are repeated in our daily experience. Who of us has not, long before his intelligence developed into full maturity, on various occasions dimly felt the correct solution of moral problems? As there is a life-preserving instinct in the world of lower animals, so there is a soul-quickening moral instinct in man which is mystically experienced. Professor Harnack seems to believe that our mystical experiences cannot or should not be subjected to scientific analysis. If this is his position, we differ from him; if not, how can he arraign the Religion of Science as profitless?

Professor Harnack may regard the Religion of Science as rationalism; and in a certain sense it is rationalism, but in another sense it is not. It all depends whether we mean by rationalism simply a free exercise of man's reason, or that historical movement which attempted in a most prosy way to rationalise the religious traditions of Christianity. On the one hand, we do not say that man can be saved by reason and by reason alone, for man must work out his salvation with diligence; he must be active and energetic, and in order to continue in his work he must have the enthusiasm of faith and a holy zeal for the cause of truth. Reason is only one side of man's being, and we are not blind to the existence and importance of other sides. But on the other hand we say, Give unto reason what is reason's; hand over to rational inquiry the whole field of your experiences, external as well as internal, and investigate the bottom facts from which develop such religious ideas as God, soul, and immortality. There is truth in all of them, and you will find that a real, thorough comprehension of your religious notions will always tend to deepen them, and will show truth in a higher significance and a nobler sublimity. For truth is greater than all mythologies.

Professor Harnack has not as yet found the unity of nature and spirit, but he believes in it; he trusts to find it "not in the Unknown, but in the living God." Very good! search for unity and you will find it—not in the Unknown,* but in the knowable realities of life. The first condition, however, of finding a unity of nature and spirit is to drop the antithesis between both, for spirit is natural; spirit is a part of nature as much as a man's thoughts are part of the man. Nature is the whole, and spirit is the crown of nature; it is nature's divinity, without which the whole creation would be a meaningless jungle.

It is not my intention to criticise Professor Harnack's confession of faith, which he calls "a living faith in the living God" (see, for instance, p. 546). But I cannot help criticising the form in which he states it. A God who is not a living God is no God, and a faith that is not a living faith, that is to say, an actual power in man's soul, is no faith. What is the use of heaping up words, which in their unnecessary iteration make the impression of contentious protestation? Professor Harnack contrasts the living God with "the philosophical or mystical abstraction" (p. 546), and calls the former "the revealed, the assured, the gracious God, apprehensible to every Christian."

Had Professor Harnack borne in mind the nature of knowledge and the methods of representing realities in thought, he would not have ventured upon these amplifications. What is his idea of man's soul but an abstract, while the object which the word soul represents is a living reality? All our notions are abstracts and the idea of God is as much an abstract as the terms matter and energy. Death will lose most of its horrors in the mind of a thinking man, especially if he is an experienced physician; is for that reason a more scientific conception of death less real than the fright of a panic-stricken crowd? The physicist's definition of force is not of a paler cast of thought than that of the farmer, and the philosopher's idea

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* Professor Harnack probably regards *The Monist* as an agnostic publication. He is mistaken. Professor Harnack is probably more agnostic than *The Monist*, for his "living God," who is not the Unknown, is later on called "the mysterious Being."

of God does not grow lifeless in the degree that it becomes more exact. Professor Harnack's expressions would pass unchallenged in a prayer-meeting but are out of place in a scientific elucidation where they are not only liable to be misunderstood as orthodox asseverations, but are also actually erroneous, bringing about an antagonism between religious sentiment and the philosophical comprehension of religious ideas which does not exist. That God, who in order to be and remain alive, must not become philosophical, is doomed before the tribunal of scientific critique.

The science of nature, as a whole, and also the various branches of science, especially psychology and ethics, are of greater importance to theology than Professor Harnack is aware of. He says:

"Of what assistance can the science of nature be to me, if I wish to find out to what *persons* our present humanity is most indebted for those powers of faith and conscientiousness of love and sacrifice, of courage and industry."

He lays great stress upon the fact that the Gospel *is* Jesus Christ —a person. He says in his "History of Dogma" (Engl. tr. p. 10):

"It can be shown, that everything that is 'lofty and spiritual' in the Psalms and Prophets, and everything that had been gained through the development of Grecian ethics, is reaffirmed in the plain and simple Gospel; but it obtained its power there, because it became life and deed in a *Person*, whose greatness consists also in this, that he did not remould his earthly environment, nor encounter any subsequent rebuff,—in other words, that he did not become entangled in his times."

Setting aside the question as to the nature of Christ's greatness, we wish to say that any one who lays so much stress upon the incarnation of the Gospel in a person should first of all concentrate all his attention upon finding out what is the nature of personality. Much has been done of late in this line. I only remind the reader in this connexion of Prof. Th. Ribot's excellent memoirs on psychological problems. As soon as we understand the nature of a personality we shall overcome the mysticism that is still attached to the theological conceptions of the soul and the soul's immortality. We shall also learn to understand why God cannot be personal but must be superpersonal. Professor Harnack is at liberty to denounce the idea of a superpersonal God as atheism. We shall patiently bear the opprobrium, in the hope that he will himself by and by come

to the conclusion that the attribute of personality can only belittle God and that the belief in a personal God is after all only a higher type of paganism.

Having, in his way, characterised the Religion of Science, Professor Harnack says, "I should rejoice if I were mistaken." Very well then, there is cause enough to rejoice; and let me add, that I have always regarded Professor Harnack as one of the chief pioneers of the Religion of Science. I am sorry to see that he has not as yet freed himself from the bondage of mysticism; but since in his work he adopts the ethics of the Religion of Science, we must feel confident that his path will lead him at last into the full light of the new dispensation which is the fulfilment of all the old prophecies, the only orthodox and the only catholic religion.

EDITOR.

LEONARDO DA VINCI AS A PIONEER IN SCIENCE.

IT WERE easier for the mature intellect to recover that belief in fairy-tales which is the privilege and joy of childhood, than for any of us to return to a point of view which enlightened men have long since left behind. If our imagination be keen and our sympathy quick, we can perhaps understand what it was that our forerunners believed, but we shall never feel towards it as they felt. There are no dryads in the woods, no naiads in the streams, for us; the rudely hewn block of wood is no fetish to which we bow; the story of griffin or vampire does not affright; the naïve mediæval miracle wrought by some pious relic has no power to confirm our faith: in these things we detect at the most an allegory or a hallucination. The race makes certain advances, as a traveller journeys through a strange country by night, without being able to map out its course. Not only are the gates of birth and death wrapped in the mists of lethe, but so too are the thresholds of progress. Only in the realm of reason, and of morals derived from reason, do all men walk as equals and contemporaries. The mirage of fancy, the fog of superstition, vanish as the sun of reason prevails; once men regarded them as permanent realities; now we know that they were evanescent; herein lies the difference between us and our ancestors,—a difference absolute and unalterable.

As we are more learned so are we more sophisticated than our fathers. We hesitate to say of any truth "This is final," because finality implies a world bound in adamantine unchangeableness, whereas we perceive that ours is a fluent and unfolding world. This perception, which is coming to be the common property of cultivated

men, even of those who strive most earnestly against it, distinguishes the Modern from the Middle Age. To us, all things are in process of development; to the mediæval, all things—religion, science, government—were fixed. The earth itself was to him the centre of the universe, a fixed point round which the planets, sun, and stars revolved; his religion, formulated long before according to supernatural dictation, might be neither amended, nor put in question. Philosophy was not the exploration of the infinite by finite man, but the exercise of his mind along a clearly defined path which always curved back to the starting-point. Science was a mixture of half-truths and absurdities: the dictum of Aristotle, Ptolemy, or Galen being accepted as infallible, even when plainly contradicted by the experience of every day. Government, in theory at least, was a rigid scheme foreordained from the beginning.

I am not concerned to point out what benefit the race derived from that age of formulas; benefits there were, if only in the knowledge gained that the soul cannot prosper in bondage; my purpose is to call fresh attention to the contrast between that age and our own, in order that we may measure the magnitude of the achievement of such men as Leonardo da Vinci who broke away from mediævalism, and who, though surrounded by conditions utterly unlike ours, nevertheless belongs in spirit to our time rather than to his own. That spirit was the spirit of inquiry, the modern spirit; the mediæval did not inquire, he took for granted. Not only in all those considerations which haunt serious minds—the nature of God, immortality, conscience—did he accept without demur the statements handed down to him, but also in purely physical affairs was he uncritical. Read the manual of the medical school of Salerno, and see how hearsay and superstition took the place of observation in the treatment of the simplest form of disease. Read Brunetto Latini's "Natural History" and see what fantasies were spread concerning the animal kingdom. One example will illustrate the general attitude of mediævals towards demonstrating facts: There was an old fable that salamanders can live in the hottest flame. A modern would have put a salamander in the fire and watched the effect; the mediæval, on the contrary, never thought of applying so simple a

test,—he believed the fable, and gravely repeated it. His habitual attitude was one of credulity.

We need not wonder at this. Inquiry presupposes ignorance, a worthy desire to clear away doubts. We do not dispute over the multiplication-table. But to the mediæval the ultimate mysteries of human destiny were wholly removed from the pale of inquiry; he might not understand the strange scheme of the incarnation, of vicarious atonement, of the resurrection, but he believed it, and believing, he ceased to inquire. He did not doubt the reality of heaven or of purgatory: he was more certain of the existence of hell than of the countries beyond his native mountains. This certainty could not but discourage investigation into the primal mysteries.

Moreover, his creed tended to make him despise the material world in which he lived. The Christianity which he professed was a composite of Hebrew, Persian, and pagan beliefs, which had been fitted together at different times. That they were mutually contradictory did not trouble him, because he gave a proof of his faith when he believed impossible doctrines; that they conflicted with the simple, authentic teaching of Christ did not trouble him, because that teaching came to him after councils, doctors, and a hundred popes had stamped their several interpretations upon it. Among the strange doctrines which had wound itself round early Christianity was the Manichæan doctrine that matter is the product of an evil principle, a Devil, who wars perpetually against God, the creator of spirit. This being accepted as true, the part of the devout mediæval was plain: he strove to eschew the material world as the Devil's kingdom. This world included, of course, his own body, which he mortified to the glory of God and the discomfiture of Satan. To have allowed his attention to wander to the processes of nature and to have examined into their causes would have been unholy and perilous: unholy, because in so doing he would have given to the works of God's adversary interest which he ought to consecrate to God alone; perilous, because the Devil had cunningly sown the world of matter with lures to ensnare the souls of men. And after all what could it profit him to learn all possible knowledge concerning the material world? In God's world, in heaven, which

he hoped to enter after a brief exile here below, such knowledge would be irrelevant, useless, impious. His body, therefore, was not merely an inert clog to salvation, it was the active ally of the Fiend, who spread before every one of the bodily senses attractions to entice the soul away from the contemplation of God. Pleasure became synonymous with sin ; beauty was the mask of temptation. Only by a strenuous asceticism, a mortification of the senses, and a starving of all mundane desires, could the mediæval devotee cheat the Devil. No wonder that he walked on tiptoe, as over young ice, when one misstep would plunge him into the abyss forever ! No wonder that he gave the least possible heed to the properties of laws of matter !

But in the thirteenth century Christendom began to awake, began to suspect that it had been the victim of a hideous nightmare. Dante, the first modern man, embodying the theology of the Middle Age and foreshadowing the realism of the new age, made an allegory of the actual moral condition of men on earth. The epic poets of antiquity had sung the adventures of gods and heroes ; Dante wove an epic out of the experiences of the human soul on its passage from the depths of imperfection to the heights of righteousness. Hitherto, an unbridgeable chasm had yawned between pagan and Christian times ; Dante, feeling profoundly the continuity of the life of the race, introduced into his vision the chief personages of pagan history and mythology, together with the saints and heroes of Christianity, and his own contemporaries, in order to complete his portrayal of human character. This was a long step gained ; it was an admission that whatever might be the destiny of men in the world to come, they could all, whether born before or after the birth of Christ, be measured by the same moral scale in this world.

Close upon Dante followed Petrarch, Boccaccio, and the swarm of Humanists. Learning ceased to be the exclusive privilege of ecclesiastics. The conviction deepened that man's life on earth is most interesting for its own sake, irrespective of its being, or not being, the preparation for eternal life hereafter. Across a thousand years the civilisation of Greece and Rome loomed up in fascinating grandeur. Over the barrenness of ages the fresh vital air of Athens blew straight upon Italy, as a pollen-bearing wind in spring-time ;

and the Humanists breathed its freedom and joyousness as eagerly as a bedridden patient would welcome health, or an old man his vanished youth. How futile now seemed the quibbles of the schoolmen! How mistaken the crabbed precepts of mediæval theologians! How repulsive, narrow, and unnatural the life that they had led! The Greeks, the Romans, with no Christian teaching to guide them, with no ascetic fanaticism, had lifted their commonwealth to a plane of grandeur far above that of any subsequent State; and in virtues, civic or private, in poetry, in commerce, in the arts, they had surpassed their Christian successors. To recover all that could be recovered of that classic civilisation, its ideals and achievements, became therefore the passion of the Humanists; they searched each ancient manuscript as if it were a lost will in which they might find that some forgotten ancestor had bequeathed to them an incalculable fortune. That must ever be regarded as one of the noblest epochs in the history of the race when the best men joined the pursuit of things spiritual and intellectual with all the fervor and pertinacity with which their descendants a century later set out in quest of Eldorados in America and to conquer the material wealth of the Indies. The immediate result of this enthusiasm was to bring to the Humanists a sufficient knowledge of the ancient civilisation to enable them to compare this with the mediæval Christian standard which had hitherto reigned alone. From this comparison sprang criticism, the handmaid of truth.

Little enough did the early explorers suspect whither their quest would lead them. They could not guess that a search for classic manuscripts would end, as Michelet has it, in the discovery of man and of the world. Yet so it was. The spirit of inquiry, roused from its millennial torpor, hungrily investigated all things. The old answer to the riddle of existence was cast aside as unsatisfactory; a new answer must be wrested from the dumb, inscrutable universe. In their first passion for discovery, men did not dream that the solution might elude them. Wherever they looked they saw untrodden avenues leading into the heart of the mystery. Discarding mediæval preconceptions, they began to study human nature. They looked upon the earth and saw that it was fair, and its

beauty no longer seemed to them a Satanic lure. They began to see in the world of matter orderly processes, the coursing to and fro of vivifying laws, like blood in the arteries of man. They looked upon the heavens, and their souls were awed by a premonition of vastness only consonant with the belief that God, and not the Devil, was their author. In the presence of the sublime immensity of the stellar spaces, the cramped view of human destiny as expressed by mediæval dogma, must seem impious and absurd. By the close of the fifteenth century men were beginning to rise to the conception of a cosmos, of a world forever *becoming*, alive and interrelated in all its parts. The old notion of fixity,—of one unchanging religion, of one foreordained and immutable ideal of government, of earth anchored in space, and of man the crown and centre of creation,—was doomed. The discovery that this is a living and unfolding universe was the most important event in human history since the birth of Christ.

I would not paint the achievements of the Renaissance in colors too gorgeous, nor imply that the men of that epoch understood the bearing of the movement they originated. Many of the deductions drawn from their tentative investigations have been drawn very recently. Many of the paths they opened and explored diverged into the wilderness where the footsteps of man flounder perilously and the soul of man finds no cheer. I have elsewhere stated * some of the deficiencies, the appalling, cardinal deficiencies, which, in Italy, at least, caused the Renaissance to be partial and temporary. But after deducting from it what we must, it remains a period of inestimable significance. If its very doubts were pregnant, how shall we define the truths it revealed, truths typified by the discoveries of Columbus and Copernicus, and by the invention of Gutenberg? The mission of the Renaissance was to establish reason as the final guide and judge of mankind. With the enthronement of reason, the German Reformation, the American commonwealth, the French Revolution, and every other advance which the race has made, became intelligible.

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*See *The Dawn of Italian Independence*, Vol. I, Chap. 6.

To *rationalise* nature, to discover, that is, reason in her manifold operations, to substitute for the mediæval scheme of ignorance and miracle the idea of cosmic order, has been the particular business of science for more than four centuries. We who inherit the knowledge accumulated by the patience of countless investigators and co-ordinated and classified by a few master thinkers, cannot put ourselves back into that state of mind in which the earliest explorers set out. Immemorial traditions, habits of thought, lack of instruments, theological prejudice, were all against them. Nature lay under a ban. The world was an inert mass. To overcome these obstacles required the development of other organs, the implanting of the spirit of inquiry. The wisest men had hitherto been as babes in the presence of the majestic forces of the material universe. The laws of gravitation, of expansion, of heat and cold, worked in and through them, yet they heeded them not. Electricity sped on its errands from zenith to nadir, invisible, swift as an archangel, yet were they unaware of its passing. They were blind to nature's beauty and power, deaf to her innumerable voices. In what mysterious manner a few men began to see and hear, let those explain who know how the acorn enfolds the far-spreading oak in its shell, and how in an embryo lie dormant the intellect and soul of a possible Cæsar or Shakespeare.

What we do know, however, is that in the fifteenth century a few men began to scrutinise nature, very tentatively at first, and with no premonition of the results which such scrutiny would reach. Foremost among them was Leonardo da Vinci. Other investigators of that century, Copernicus the most conspicuous, have ranked higher than he in the annals of science; but none, as I hope to show, equalled him in scientific endowment. He was disenthralled from mediæval preconceptions, for he possessed a temperament so purged of theories that in approaching a new fact his sole aim was to discover the true nature of that fact, unbiassed by what others had found in it. His curiosity was insatiable; his methods were observation and experiment; his advance was from the known to the unknown, whereas the mediæval, as we have seen, took the unknown for granted, and ceased to inquire. That Leonardo's achievements

in science and invention should never have had due recognition, is to be attributed in part to their great range—the world remembers longer him who travels farthest in a single direction, than him who travels far in many; and in part to an accident which buried them for three centuries. Even now we have but an imperfect record of them. Not as a candidate for belated fame—Leonardo's fame is secure—but as a pioneer of the modern spirit, and as a favorite whom Nature took into her confidence, let us consider him here.

The important facts in Leonardo da Vinci's life can be briefly told. The natural son of a Florentine notary, he was born at the castle of Vinci, on the Arno, between Florence and Pisa, in 1452. Vasari relates stories of his youthful precocity, which often astonished his instructors, and of his fondness for music. Being admitted early into the studio of Verrocchio, he learned not only painting and sculpture, but also the goldsmith's art, which, we may remark, had an influence not easily to be computed in giving to the Florentine School of Painting that precision, that loyalty to the line, which distinguish it from the Venetian School. How the young Leonardo painted into one of his master's pictures an angel far beyond Verrocchio's skill, and how he drew a Gorgon's head so life-like that it frightened persons who came upon it unawares, need not here be repeated. In 1472 he was already an independent artist, and during the next eight or nine years he worked in Florence, but to what purpose we can only guess, as almost all the fruits of this period have been lost. In 1480 he addressed a remarkable letter to Lodovico Sforza, tyrant of Milan, asking for employment and laying chief stress on his ability as a military engineer. The letter brought him an invitation to go to Milan, where he was engaged in mechanical and engineering enterprises, in the direction of ducal festivities, and in the construction of a colossal monument to Francesco Sforza, Lodovico's father. The fresco, "The Last Supper," is one of the few remaining authentic works of Leonardo's brush during his long residence in Lombardy, and no one now can say that a single patch of color in that ruined masterpiece was laid on by him. Indeed, fate, which showered upon Leonardo innumerable gifts, seems to have decreed that posterity should know his genius by hearsay only, so per-

versely has fate allowed his works to be lost or mutilated. That colossal statue of Sforza was not yet completed when Louis XII. invaded the Milanese and put an end to the sculptor's work there; the great fresco has suffered irreparably from neglect, violence, and restoration; and of the half-score paintings which remain scarcely one gives us a hint of the beauty of its original coloring.

In 1500 Leonardo visited Venice and Florence. Two years later he was appointed engineer by Cæsar Borgia, who was engaged in a military expedition against those States south of the Po that had not already submitted to his tyranny. During this summer we have glimpses of Leonardo at Urbino, Pesaro, Rimini, Cesena, and Cesenatico, along the Adriatic; at Siena, Chiusi, and Orvieto in the Centre; and at Piombino near the Tuscan Sea. In the following spring he settled at Florence and painted "The Battle of Anghiari" on one wall of the council hall of the Palace of the Signory, while on another wall his young rival, Michael Angelo, painted a vast group of "Soldiers Bathing." Not a trace of either fresco survives. But Leonardo, never at his ease in Florence, returned to Milan in 1506. Thenceforward, until 1515, he seldom stayed long in any place; till Francis I. came into Italy and induced him to go back to France, where he was assigned a residence at the Château Cloux, near Amboise on the Loire, 1516. There he died May 2, 1519, and was buried in the Royal Chapel at Amboise.

In person, as in mind, Leonardo lacked no gifts. He excelled in dancing, in fencing, in horsemanship, in lute-playing. Well-known anecdotes, chiefly drawn from Vasari's precious and inexhaustible quarry, illustrate alike his unusual physical strength and his wonderful dexterity. He was genial in temper and kind in heart, and he possessed the rare combination of humor and wit. His interest in man and in nature was many-sided and unflagging; nothing being too vast or too minute for his attentive curiosity. He had the patient inquisitiveness of the specialist who pores over details; he had also the generalising faculty of the philosopher who deduces laws and discovers wider relations. His attitude towards life was, in a word, thoroughly modern and scientific. As little as possible did the past, with its traditions and dogmas, hamper him: to search

out all things, to experiment and verify, to let his own eyes test and reason be the judge—this was Leonardo's method.

That letter which Leonardo wrote to Lodovico Sforza is still extant, and it throws so much light upon his genius and his self-knowledge that it is worth quoting almost entire:—

"Having, most illustrious lord, seen and considered the experiments of all those who repute themselves masters and inventors of warlike instruments, and having observed that their said instruments are nowise different from those in common use, I will attempt, without disparaging any one else, to explain myself to your Excellency; opening for this purpose my secrets. . . .

"1. I have a way of making bridges, very light and adapted to be carried very easily, by which to pursue or escape from an enemy; and others more secure, and indestructible by fire and battle, easy and convenient to set in position and to remove. And means for burning and destroying those of the enemy.

"2. In investing a place, I know how to remove water from fosses, and to make various scaling-ladders, and other instruments pertinent to such an expedition.

"3. *Item*, if, on account of the bank or strength of place and site, in the siege of a city cannon cannot be used, I have means of undermining every fortress, provided it be not founded on stone.

"4. I can make cannon easy and convenient to transport, by which burning stuff can be discharged, whose smoke will cause great fear to the enemy, to his serious harm and confusion.

"5. *Item*, I can make mines and narrow and winding ways to reach without noise a given [point]; and, if need be, I can make them pass under trenches or a river.

"6. *Item*, I can make covered carts, secure and indestructible, which, with their artillery, entering among the enemy, will break the strongest body of men; and behind these carts infantry can follow unwounded and without any hindrance.

"7. *Item*, if necessary, I will make cannon, mortars, and fire-arms of most useful and beautiful forms, different from those in common use.

"8. When cannon are impracticable, I will devise catapults, mangonels, mortars (*trabuchi*), and other instruments of wonderful efficacy and novelty; and, in short, according to the variety of needs, I will invent divers and many engines of offence

"9. And if by sea, I have a lot of instruments most suitable for attack and defence; and vessels that will resist the fire of the heaviest cannon; and powders and fire-stuffs.

"10. In time of peace, I believe I can give good satisfaction—in comparison with any other—in architecture, in constructing edifices, both public and private, and in conducting water from one place to another.

"*Item*, I can do in sculpture of marble, bronze, or clay, likewise in painting.

equally as well as any other, be he who he may. Further, the work might be executed on the bronze horse, which will be the immortal glory and eternal honor of the happy memory of your father, and of the illustrious House of Sforza. And if to anybody any of the above-mentioned things seem impossible and unachievable, I offer myself most ready to make trial of them in your park, or in whatever place shall please your Excellency, to whom in all humility I commend myself."

In this letter, written when he was only twenty-seven or twenty-eight, Leonardo magnifies his ability as an engineer and speaks but briefly of his skill as an artist—briefly, but haughtily, as that phrase "equally as well as any other, be he who he may," bears witness. In a little man such an inventory of talents would sound presumptuous, but Leonardo can do all that he announces. He is seeking employment from a military tyrant who needs engines for conquering his foes more than he needs paintings or statues; and therefore Leonardo insists on his own pre-eminence as an engineer. But there shall be frescoes, too, and monuments, and rare products of the arts of peace, if only Louis "the Moor" will listen to him.

Let us now survey the circle of his achievements.

Leonardo flourished in a period of transition when mediæval weapons were being replaced by modern fire-arms. The tremendous military value of gunpowder, after its discovery by Roger Bacon in the middle of the thirteenth century, had not quickly been perceived. Cannon were used, it is true, at the battle of Crécy, in 1346; but their general adoption can hardly be dated earlier than the last quarter of the fifteenth century, when they were used by the Spaniards in the conquest of Granada, by Louis XI. in his wars with the great French feudatories, and by the Italian mercenaries in their sordid, dilatory campaigns. So among Leonardo's inventions we find some which were improvements on the pikes, cross-bows, and catapults of the earlier system, and others which, adapted to the use of gunpowder, extended the scope of the new system. He designed a huge machine, to be worked by ten men in treadmill fashion, from which a large and almost simultaneous volley of shafts could be discharged—a forerunner of the Gatling gun and the *mitrailleuse*. He also planned great catapults, and an enormous copper cannon, which he called *Architonitros*, to be exploded by steam. He

ascertained that cannon-balls have a velocity of one hundred and ten metres per second, and that it is useless to increase the charge of powder, unless the size of the grain be increased. He experimented with fusees; he devised methods for strengthening fortifications by artillery, and for making ravelins, mines, and storming-machines. Just how far he advanced the art of fortification cannot be determined, for we cannot tell how much Vauban invented himself, and how much he borrowed from the Italian military engineers who preceded him, among whom Leonardo stands foremost. The very important principle of clearance fire, often credited to the Frenchman, appears to have been understood by his Florentine predecessor. Certainly, Leonardo made drawings of what are apparently breech-loading guns. He computed the relative speed and efficacy of stone and lead balls, and suggested that they be conical instead of round. In marine warfare and in navigation he designed improvements. He mentions the log for showing a ship's progress at sea; hitherto, the earliest reference to the log was made by Magellan in 1521. He invented swimming-belts, and, more important still, paddle-wheels by which boats might be propelled against wind or current.

A century before Stevinus, Leonardo pointed out the need of a rational treatment of mechanical problems; possibly he suspected the uniformity of mechanical laws. He found the centre of gravity of a pyramid; he explained the theory of the inclined plane; he studied the phenomena of concussion, of friction, of the resistance of springs. He invented a dynamometer. Some of his axioms deserve to be cited, for comparison with those now held to be true: "Percussion," he says, "is power reduced into a little time," and "exceeds, in equal time, every other natural force"; "An object which falls freely, acquires in every degree of its descent degrees of velocity;" "A man walking goes faster with his head than with his feet;" "That body will become lighter which occupies more air;" "No dead object moves by itself, but by another is its motion caused;" "No moving object will ever move faster than the force which moves it;" "Every action is the result of motion." In his experiments he used elastic balls suspended by threads, a device

adopted by Borelli and later physicists. He was aware that a body can be under the influence of more than one motive force at the same time. In his researches in attrition and friction he anticipated L'Amoutons (1699), Bülfinger (1727), and Desaguliers (1832).

Although his notes on this subject are scanty we infer that he gave attention to electricity. According to Libri,* he first remarked the regular movement of dust placed on elastic surfaces in vibration. Like the inventors of our own times, he aimed at substituting a machine for a man, wherever this substitution would save labor. That he was the first to employ the *plus* and *minus* symbols, is an assertion I am unable to verify.†

Coming next to botany we find that Leonardo's priority in several important discoveries has been recently established. G. Uzielli‡ traces the advance he made in three directions, as follows:

First, Leonardo discovered the laws of phyllotaxis, or the arrangement of leaves on their stem. He was the first to observe that the order of growth in plants and trees of the same species is uniform, and that their leaves have three different modes of distribution: they may be placed opposite to each other; they may be whorled, or verticillate; they may be alternate, or spiral. He demonstrated that when leaves grow in pairs they have generally a decussate arrangement, that is, each pair is at right angles to the pair directly above or below it; and he also showed that when leaves are verticillate, those in one whorl are seldom in a direct line with the whorls above and below. He noted that the *quincuncial* form is common in the spiral arrangement, the cycle being completed by five leaves, and the sixth leaf being in a direct line with the corresponding leaf above and beneath. "Since branches grow from buds generated in the axils of leaves," he said, "the arrangement of branches on the trunk necessarily corresponds to that of the leaves on the stem." To Sir Thomas Browne, whose book, "The Garden

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* Libri: *Histoire des Sciences Mathématiques en Italie*. Paris, 1840.

† Richter, in his work on Leonardo da Vinci (London, 1880), regards this as not proved.

‡ *Il Nuovo Giornale Botanico Italiano*, Vol. I, No. 1, 1869; quoted in *Nature*, Vol. II, p. 42.

Cyrus, or the Quincuncial Lozenge," was printed in 1658, the merit of this observation has been hitherto attributed.

Second, Leonardo discovered that the age of exogenous trees can be determined from the structure of their trunks. He writes: "The southern part of the plant shows more vigor and youth than the northern. The rings of the branches of trees show how many years they have lived, and their greater or smaller size whether they were damper or drier. They also show the direction in which they were turned, because they are larger on the north side than on the south, and for this reason the centre of the tree is nearer the bark on the south than on the north side." Malpighi and Grew (whose works appeared in 1675 and 1682 respectively) have heretofore enjoyed the honor of this discovery. But Montaigne mentions (in his "Journey into Italy," July 8, 1581) that at Pisa he bought several curiosities, and that "the person of whom I bought these things, a man of great note as a mathematical instrument maker, told me that trees have all within them as many rings and circles as they number years. He showed me examples of this in every kind of wood in his shop, for he is a turner by trade. Those trees in a forest which look northwards have these rings closer and thicker than the trees which stand in other directions; and this person told me that this was so invariably the case that by looking at a piece of timber, he could tell how old the tree was, whence it came, and in what direction it had stood." Montaigne's "Journal" was recovered only towards the end of the eighteenth century, so that Malpighi and Grew could not have borrowed from it, but it seems probable that the facts he mentions as having been disclosed to him by the Pisan turner, may have been generally known in the seventeenth century.

Third, Leonardo investigated the process of growth in exogenous stems by the formation of new wood on the bark, a process he describes thus: "The growth in the size of plants is produced by the sap, which is generated in the month of April between the outside coating (*camisia*) and the wood of the tree. At the same time this outside coating becomes converted into bark, and the bark acquires new crevices of the depth of ordinary crevices." This explanation is, I believe, no longer accepted by botanists; but, though

Leonardo's conclusion was inaccurate, his researches must have contributed to the discovery of the truth. He made many drawings of leaves, which for exactness and beauty have never been surpassed.* He also pursued other, more fanciful, experiments, as, for instance, one for testing the effects of poison on trees, by boring a hole in the trunk and injecting arsenic, or sublimate, in alcohol. And he described how an impression of leaves may be had by smearing them with white lead, oil, and lamp-black—as ink is spread on the types—and stamping them on paper: a process which, somewhat modified, has recently been used with success by Hauer and others.

That he was a close observer of outward nature, his paintings and drawings of landscape abundantly testify; but he went deeper than the surface, and foresaw more than one vital fact which geologists have since established. Fossils, he maintained, are the remains of plants and animals of a bygone age, and not, as was commonly asserted by his contemporaries, mere "freaks of nature." When fossil shells were still in the sea, he affirmed, river-mud near the coast had penetrated into them. "They tell us that these shells were formed in the hills by the influence of the stars; *but I ask, where in the hills are the stars now forming shells of distinct ages and species?* and how can the stars explain the origin of gravel, occurring at different heights and composed of pebbles rounded as if by the motion of running water; or in what manner can such a cause account for the petrifaction in the same place of various leaves, seaweeds, and marine crabs?"† In thus proclaiming the continuity of geological causes, Leonardo proves his kinship with the masters of modern science. He attributed the denudation of mountain-peaks to the gradual subsidence of water, and saw that the direction of a falling body must be affected by the rotation of the earth—an obser-

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*"I might refer in detail to four studies of bramble branches, leaves, and flowers, and fruit, in the Royal Collection at Windsor, most wonderful for patient accuracy and delicate execution; also to drawings of oak-leaves, wild guelder-roses, broom, columbine, asphodel, bull-rush, and wood-spurge in the same collection. These careful studies are as valuable for the botanist as for the artist. To render the specific character of each plant with greater precision would be impossible." J. A. Symonds, *The Renaissance in Italy: The Fine Arts*, p. 320.

† Quoted by Lyell, *Principles of Geology*, p. 19 (edit. 1862).

vation which probably explains the following memorandum: "Write to Bartholomew the Turk about the ebb and flow of the Pontic Sea, and to find out whether a similar phenomenon exits in the Hyrcan, or Caspian Sea." He held that valleys are the beds of former rivers.

His observations of the moon are even more interesting. He it was who, long before Kepler and Galileo, demonstrated that the faint light which we see on the new moon is reflected from the earth.* Kepler, in 1596, and Galileo, a few years previous, published their explanation of this phenomenon. Leonardo believed that the solar light is radiated to the moon from those parts of the earth where there is most water: "The water which clothes a large portion of the earth receives on its surface the image of the sun, and with this shines upon the universe and becomes a star with the same splendor which makes us see the other stars." He also stated that "the moon has each month a winter and a summer, and has greater heat and cold, and her equinoxes are colder than ours." To a lunar inhabitant, he said, the earth performs an office like that which the moon performs for us by night. Although the Ptolemaic system still commonly obtained—the terrestrial explorations of Columbus, and the celestial explorations of Copernicus having as yet aroused the suspicion in only a few alert minds that Ptolemy's doctrine rested on a fallacy—Leonardo maintained that the earth is round, and showed that at a distance of fourteen miles at sea, a man's body is hidden, owing to the earth's curving surface; the distance is incorrect, but the fact of sphericity has long been undisputed. Still more daring appears his assertion that "the earth is not situated in the middle of the sun's orbit, still less at the centre of the universe," when we remember that the Church persecuted more than one man of science for hazarding this assertion, and that even to-day, the majority of otherwise intelligent persons, are unwilling to relinquish the flattering tradition which ascribes pre-eminent importance to our planet, and to ourselves as its inhabitants.

Several maps designed by Leonardo, and preserved in his "Co-

* Humboldt, *Cosmos*, IV, 483.

dice Atlantico," illustrate his geographical range: to them we may add topographical plans of many parts of Italy where he was engaged in engineering. During his life-time he was best known as an engineer—always excepting his renown as an artist—and as an engineer his name is still familiar to many who have no definite notion of the versatility of his genius. All travellers have seen specimens at Milan of his mechanical drawings, and have been told that the canal system perfected by him still supplies Lombardy with water. The Martesana canal had already been partly excavated when he took charge of it; but he invented the locks which are still in use, and which superseded the clumsier Saracenic gates previously employed. He proposed a method for draining the marshes of Piombino; he drew a plan for changing the course of the Arno by means of a canal, which has subsequently been carried out; he made sketches, when in France, for the so-called Romorontin canal; he devised a big auger for boring artesian wells; he proposed to fertilise the sterile plains of Prato and Pistoja by collecting vegetable slime or muck in reservoirs, and applying it to the soil. When but yet a youth, he offered to raise the Baptistery at Florence, in order that its foundations might be strengthened and heightened: his project, then laughed at as well-nigh crazy, has been commonly adopted in our American cities during the past twenty years, and the raising or removing of huge buildings no longer excites our wonder. He understood also the art of tunnelling. Among his drawings we find a device "by which a stream not navigable, either by reason of too little depth, or from liability to failure in time of drought, may be made useful, by dividing it into sections by diagonal dams provided at the small angle with locks." Derricks, furnished with automatic dumping-hods, like those now used, for excavating canals, are drawn and described by him, as well as a machine for raising water from a stream to the top of a tower by means of Archimedean screws.

"Mechanics," said Leonardo, "is the paradise of mathematical sciences." He invented more than thirty kinds of mills. He made files by machinery, and made machines for sawing marble, for spinning, for shearing the nap of cloth, for planing iron, for making vises, saws, and planes, and for erecting marble columns—according

to a principle recently followed in setting up Cleopatra's Needle on the Thames Embankment. Suction and force-pumps, water-wheels, and hydraulic presses were also constructed by him. He experimented in the distillation of oils and poisonous vapors to be used in warfare. In some of his sketches boats furnished with paddle-wheels are seen; in others, we find a diver's apparatus, with glass eyes and a tube for air, but no air-pump. Among his other inventions may be mentioned a proportional compass, similar to that invented by Burgi in 1603, and still known to engineers; a surgical probe, having longitudinal sections, and a screw for expanding the mouth of the wound; a gold-beater's hammer; a machine for tilling the earth by the wind's agency; cranes, windlasses, and plummets. But the most important of all, if we judge by the labor it has saved and by its universal adoption in Europe and America, is the wheelbarrow, which the French long attributed to Pascal. It would be tedious to ennumerate all the suggestions and contrivances which have already been discovered from Leonardo's only partially edited manuscripts, but a few more must be recorded, in order to show that his incessant ingenuity busied itself not less with the smallest than with the largest inventions. Among devices directly applicable to the commonplace needs of life are an automatic turn-spit, or roasting-jack; a door-latch; a three-legged stool for artists; a color-grinder, and a hood for chimneys.

In the fifteenth century even the best-informed men had but the meagrest knowledge of hydrostatics, a science to which Leonardo devoted himself, and of which he deduced many of the principles from his personal observations. "The gravity of liquids," he wrote, "is twofold: that, namely by which the whole mass tends towards the centre of the elements, and that which, tending towards the centre of the mass, creates the sphericity of water: but of this latter quality I see no method by human intellect to give a clear explanation, other than by saying that, even as the loadstone attracts the iron, so this virtue is a hidden property, of which infinite numbers exist in nature." He studied the evaporation of water at different altitudes; he studied also the motion of eddies. He anticipated Newton in explaining the motion of waves, which he compared to

that of wind in a cornfield; as the corn bends, but does not leave its place, so waves pass over the surface, but the water remains. He threw into the water a straw tied to a stone, by which it was quickly seen how the straw rose and fell. He pointed out that waves recede in a circle from the centre of agitation. Perceiving that drops of water are mutually attracted and coalesce into larger drops, he argued that rain-drops are largest when they reach the ground. His numerous experiments with siphons taught him, among other things, the specific gravity of liquids; and having observed that cotton absorbs moisture, he constructed a balance with cotton on one side and wax on the other, in order to know when stormy weather threatened: this was the first hygrometer.

From the study of the exterior of the human body, Leonardo was naturally led to the study of its anatomy; and in this he soon advanced beyond the scanty knowledge of his time, and explored new regions so thoroughly that subsequent investigators have been able but to confirm his discoveries. Anatomy was then a budding science. The little which European physicians knew about it during the Middle Age, they derived from the Arabs; but these were forbidden by their religion to dissect bodies, so that a true understanding of anatomical laws could not be reached. About the beginning of the fourteenth century Mondino de' Luzzi (died in 1326) dissected three bodies; but he and his immediate followers, Zerbi, Achilli, Sylvius, Massa, and others, sought merely to confirm the dogmas of Galen, and not to establish truth by an unprejudiced reference to nature; so that when their experiments failed to confirm Galen, they set it aside as fallacious and worthless. But when the authority of the Greek physician began to wane, the first principles of modern anatomy were arrived at. Foremost among the pioneers was Leonardo, who deserves the title of founder of the science of comparative anatomy. According to Vasari, he studied with Marcantonio della Torre, the director of an anatomical school at Pavia. He made the famous division of animals into two classes —those which have their skeleton inside, and those which have it outside. He scrutinised minutely the movements of living bodies, and distinguished the voluntary from the involuntary muscles, watch-

ing the action of the former in lifting, drawing, pushing, swinging, throwing, and other acts. He advised his pupils, if they would observe the natural working of the involuntary muscles, to go among the common people, whose emotions—whether of joy or pain, of anger or hate—paint themselves clearly on the features and are not hidden behind a mask of propriety or restraint. He used to invite peasants to dine with him, in order that he might study their expression, and, according to a well-known anecdote, he sometimes followed for many hours a stranger whom he casually met in the streets, and whose countenance interested him. Leonardo's notebooks abound in caricatures, which it would be impossible to match; they show how quick he was to detect the humorous and the monstrous hints in human lineaments, and how adept he was in giving them that prominence which is the basis of caricature. While working on the statue of Sforza, he studied the anatomy of the horse, and in his experiments for flying-machines he dissected birds in order to discover the secret of flight. In 1538, Vesale published a work on anatomy illustrated by many drawings which resemble closely those found at Kensington in the eighteenth century; for a long time Titian was supposed to be the author of the drawings in Vesale's book, but they are now attributed to Leonardo, and prove beyond dispute the breadth, profundity, and accuracy of his anatomical knowledge.* Knox declares that from Leonardo's design of the half-moon shaped traps of the aorta he must have understood their functions and thus antedated Harvey by a century in tracing the circulation of the blood. Hunter says: "I hold Leonardo as the best anatomist and physiologist of his time; he and his pupils first knew how to awake the spirit of anatomical studies." The following passage, in which Leonardo describes his method of procedure, is interesting enough to be quoted: "I wish to demonstrate the difference among a man, a horse, and other animals. I begin with the bones, and let follow next all those muscles which are joined without tendons to two bones; then those which at each end or at one end are provided with a tendon. I place the anatomy of

* The Kensington collection comprises 235 folios and 779 drawings.

the bones as far as the hip for this purpose and show the different muscle-layers, veins, arteries, nerves, tendons, and bones; afterwards, however, one must saw through them, in order to learn their thickness."

From painting and anatomy to the investigation of the structure of the eye and to optics was a natural step. Optics and perspective were interchangeable terms in Leonardo's time, and we know that he intended to publish a separate treatise on this subject. Some of the results of his experiments are included in his "Treatise on Painting," but by far the greater part are scattered among those thick note-books of his, from which an encyclopædia might almost be compiled. He preceded Cardanus (1530) and Della Porta (1558) in the discovery of the *camera oscura*, and Kircher and others in that of the megascope. "Perspective," he said, "is the rudder of painting," and he laid down the rule for getting correct images of bodies seen in perspective by outlining them upon an intervening glass plate, whereby he anticipated Albert Dürer. From his knowledge of the laws of vision he formulated the axiom that "a painting can never be as clear as a natural scene, for in nature we behold everything with two eyes, each of which gets a little different view from that of its mate"—a fact which may be recommended to those painters who believe that the aim of art is to reproduce nature with servile and finical minuteness. To Leonardo has also been attributed the invention of the stereoscope—he was familiar, at least, with its principles—and of the telescope. He knew that a crystalline lens produces ocular images. "I assert," he wrote, "that the crystalline sphere is sufficient to convey appearances [or images] to be received into man's mind; but for this purpose a dark place is necessary"—that is, a *camera oscura*. He showed how rays of light enter the eye upside down, and he noted that the pupil of the eye dilates in the dark and contracts in the light, and that nocturnal animals are peculiarly sensitive in this respect. He was mistaken in supposing that the scintillation of the stars is due to our eyelashes and lids, but he was correct in stating that "images are retained in the eye for a length of time proportionate to the luminosity of the body by which they are caused." He mentioned that effect

of radiation by which dark bodies on a light ground, and light bodies on a dark ground, appear respectively larger and smaller. Libri claims that Leonardo discovered the law of diffraction, but Black gives the credit of this discovery to Grimaldi (1665). It is not disputed, however, that Leonardo preceded Francesco Maurolico in observing that light, in passing through a hole, assumes the form of the object from which it is radiated, and not that of the hole. Moreover, he suggested the means (first applied by Bouguer in 1729) of measuring the intensity of light, stating the problem thus: "Given two opposite shadows produced upon a single object between two lights of double power, these lights being of equal density; to discover what is the proportion of distances between the lights and the object." We have his designs for convex, concave, spherical, and parabolic mirrors, and it is supposed that he employed concave glasses in chemical analysis. He observed the bluish shadows projected by the yellow light from the north in a clear sky behind various objects; also, that an object in front of an opening through which we look with both eyes may be invisible. It seems almost certain that he regarded light and sound as being produced in a similar manner, that is, by a series of waves.

In acoustics his researches were profitable. By studying echoes he concluded that sound requires a constant time to traverse a given distance. "It is possible to know by the ear the distance of thunder," he said, "if we have first seen the lightning, by analogy with the echo." He recognised that the action of wind interferes with the velocity of sound. Here is one of his experiments: "A blow given to a bell corresponds with and will communicate motion to another and similar bell; the string of a lute being struck will reply and give motion to a string of similar tone in another lute; and this can be rendered visible by placing a straw upon the string of the second lute." Of another acoustical problem he said: "Is the sound in the hammer or in the anvil? I say: seeing that the anvil is not suspended it cannot resound; but the hammer resounds from the leap it makes just after the blow; and were the anvil to resound . . . . just as a bell, no matter by what material it be struck, yields the same depth of tone, so would the anvil, struck by no matter what hammer.

If, therefore, you hear various sounds from hammers of various sizes, the sound proceeds from the hammer and not from the anvil."

Among what we may call the vagaries of Leonardo's scientific and inventive curiosity, we may mention designs for flying-ships, flying-men, and aërial chairs: but, should the secret of flight ever be discovered, and adapted to general use, it may turn out that his experiments were not so fantastic as they now appear. So, too, of his proposition to walk with wooden shoes on the water. In his youth he was fascinated by that chimera—perpetual motion—which still had a potent charm for investigators. But experience taught him wisdom and he called "sophistical" the arguments of those who were deluded as he had been. "It is impossible," he said, "to create by any instrument a movement of water from below to above, by means of the descent of which it shall be possible to raise a similar weight of water to the height from which this descended."

When we remember that four hundred years ago alchemy had not developed into the science of chemistry, nor astrology into astronomy, and that fact and superstition had parted company in but few minds, we shall realise more adequately the vigorous independence of Leonardo, who boldly cast off authority, and chose reason and nature as his guides. He not only called "sophistical" the attempt to demonstrate perpetual motion, and ridiculed those who wasted their time in trying to square the circle, but he also denounced alchemists as "liars." He, too, turned his insatiable curiosity to fantastic experiments, in order to make sure that he had overlooked no possible entrance into the mystery of the universe; but here, as elsewhere, he was deceived by no hallucinations, and accepted or rejected the products of his researches according to the sole standard of reason. He insists, in his "Treatise on Painting," on the infallibility of nature, "the mistress of masters." "A painter," he says, "ought never to imitate the manner of any other; because in that case he cannot be called the *child*, but the *grandchild*, of nature. It is always better to have recourse to nature, who is replete with just abundance of objects, than to the productions of other masters, who learnt everything from her." To her, therefore, he went in quest of scientific truth. He practised, a century before

Bacon, that inductive method which now obtains among all men of science. He preached the need of experiments. "Experience [or experiment] never deceives, but our judgments are deceived," is one of his maxims. "If then you ask me," he says, "'What fruit do your rules yield, or for what are they good?' I reply that they bridle investigators, and prevent them from promising impossibilities to themselves and others, and from being rated as fools or cheats." Four hundred years ago Leonardo rebuked spiritualistic frauds in this calm fashion: "There cannot be a voice where there is not motion and percussion of air: there cannot be a percussion of this air where there is no instrument; there can be no incorporeal instrument. This being so, a spirit can have neither voice, nor form, nor force, and if it takes body, it cannot penetrate nor enter where the doors are locked. And if any one should say through air collected and packed together spirit takes bodies of various forms, and through that means speaks and moves forcibly, to him I reply that where there are not nerves and bones force cannot be exercised in any motion caused by the pretended spirits."

Such is the epitome of Leonardo's discoveries—an epitome compiled almost wholly from the reports of those who have edited one volume alone of his autograph memoranda. A strange fatality has followed those manuscripts of his. At his death, he bequeathed them to his pupil Francesco Melzi, who took them back from France to Milan. There they were soon scattered, and no one could decipher them; for Leonardo wrote backwards, from right to left. It was supposed that he used a secret script, and for three hundred years nobody succeeded in reading it. When Napoleon invaded Italy he carried fourteen of these folio volumes to Paris, where they still remain. Others, including many drawings, are in England. One volume, the so-called "Codice Atlantico," is preserved at Milan; it alone has been carefully studied, and in part transcribed and photographed. What rich ore lies buried in the thousands of pages still unedited, may be inferred from what has already been brought to light.

To the accident of handwriting is due the long ignorance of the world of Leonardo's attainments in science and discovery. Gen-

erations of investigators, unaware of his work, gradually explored the fields which he had traversed, and when at length his memoranda were deciphered, science had in many directions passed beyond him. Later men had the credit of his forgotten discoveries. But the inventory of those discoveries suffices to establish his claim to rank among the supreme men of science of all time. Whatever may be the relative worth of any one of his investigations, there can be no dispute as to the absolute quality of his mind. His methods are the methods of experiment and observation by which man advances victoriously into the mystery which wraps him round.

Leonardo's contemporaries were unprepared to appreciate his scientific accomplishment. Even recent critics have deplored that one who had only four or five peers in art should waste his time in scientific inquiries. He lived so near to the mediæval superstition that his insight was mistaken for wizardry, and his researches into the properties of matter seemed whimsical or perverse. Doubtless, the incompleteness and multitude of his investigations hindered other men from understanding their importance. He did not publish his discoveries; he did not even arrange them in formal order for demonstration. Those many thick volumes are but note-books in which he jotted down day by day the experiments he was making, or the conclusions and axioms he had reached, in many subjects. At the outset, he probably intended to collect and classify these various memoranda in separate treatises, but the revelations came so fast that he had barely time to record them.

Had Adam been created at night, imagine with what astonishment he must have beheld the first faint dappling of dawn! How his wonder must have grown as the East became rosy, and the sun rolled above the horizon, and from some unseen source light was poured through the heavens and flooded the earth! Forms and then colors emerged from the darkness; sounds—of birds, of lisping foliage, the hum of insects, the ripple of brook, or quieter lapping of stream—emerged from the silence. With what delight, with what unworn curiosity must Adam have wandered amid this pageant and listened to this music: everything a miracle, untarnished by the

touch of any yesterdays; himself unconscious of time or bound, the personification of instant and immeasurable wonder.

To Leonardo the world unfolded itself in almost equal freshness, as it would to all of us if custom did not dull our perception. It was, indeed, a new world! The mediæval has looked and seen only the handiwork of Satan,—a chaos from which issued spasmodic miracles and caprice—a prison, in which the soul was detained for a few mortal years before it flew heavenwards. Leonardo looked upon this world and saw in it a divine creation, a cosmos of law, a home every nook of which had revelations for the soul. Like the Scandinavian god who could hear the grass grow, his senses were preternaturally keen. He penetrated the cuticle of things; nature lay transparent to his gaze. He saw the ebb-and-flow of cause and effect. In the least phenomenon he discerned the principle linking it to a class; in every object, in every creature he beheld the end of a clew which led back and up to the infinite. Thus almost at the beginning of the new age, he was the man whom Nature took into her confidence. To him she granted an apocalyptic vision of her secrets.

Subsequent investigators have gone farther. Every acre of the domain of science whose hither boundaries he explored, is now occupied by a specialist. But none has surpassed him in the highest qualities of a man of science—patience to analyse special facts without prejudice, and power to deduce general laws after having accumulated sufficient information. His were the qualities and the methods by which alone mankind are slowly rationalising the world in which we live. Less than any other man who died before our century would he be surprised at the advance in science and at the mechanical inventions of which we boast; for he had, what many men think they have, but have not, a vivid sense of the infinitude of the natural world and of the incalculable possibilities of human achievement. "What is that," he asks, "which does not give itself to human comprehension, and which, if it did, would not exist? It is the infinite, which, if it could so give itself, would be done and ended."

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PHILOSOPHY AND INDUSTRIAL LIFE.

AMONG the varied activities of men there are two which are often brought into contrast with one another. These are, on the one hand, the practical work, which is embodied mainly in industrial products, and, on the other hand, such purely intellectual labor as is represented by speculative philosophy. The two appear at times as if they came into contact, but are more commonly regarded as so divergent that they can scarcely have any interest in common. It is, therefore, for the sake of both, an important inquiry which seeks to determine the real relation in which they stand to each other. That relation may be conceived either in its empirical aspect as a matter of historical fact, or in its logical aspect as necessitated by rational law. In the former aspect there is one fact which it is mainly important to notice, as it counteracts a common prejudice on the subject. There is a wide-spread impression that industrial work is so incompatible with philosophical speculation, that the two appear almost in inverse proportion to one another. But the impression is founded on a very superficial reading of history. It is to a large extent a misinterpretation of facts which have their familiar origin in the essential limitations of human power. One obvious result of this limitation is found in the fact, that, if human energy is largely discharged in one direction, it must to a corresponding extent be withdrawn from others. But beyond this inevitable effect of human limitation, there is nothing in national history to countenance the impression that industrial activity has, in the experience of any community, been found to be incompatible with the philosophical spirit. So far is this from being the case, the real fact is

that philosophy has found a home mainly among those communities and those sections of a community, in which industrial enterprise has to some extent expelled the spirit and the ideals of a purely militant society.

It is not difficult to explain this fact. In the relation of philosophy to industrial life, as in the relations of social phenomena in general, each may be viewed as alternately cause and effect: in other words, the dominating category is that of reciprocal action. Taking philosophy, in the first instance, as an effect, it is obvious that industrial activity, and industrial activity alone, provides the external conditions that are necessary for the development of the philosophical spirit. A militant society, almost of necessity, absorbs the entire energy of its members in the struggle for existence. For either it must depend on the precarious supply to be obtained by plundering its neighbors, or it must wring from nature the means of subsistence by such primitive industries as the militant condition allows, and then protect these from the rapacity of neighbors that live by plunder. In either case the mere maintenance of society will be its supreme—its almost exclusive—concern. On the other hand, an industrial society, to the extent to which industrialism supplants military enterprise, tends to create that accumulated wealth, which relieves it from the incessant pressure of the struggle for existence, and enables it to set apart some of its members for that leisurely reflexion on the meaning of life, of which the products are philosophy and science and art. It may be added that the industrial spirit encourages also those internal conditions of thought and sentiment, which are favorable to philosophical activity.

If, on the other hand, philosophy is viewed as a cause, then it is obvious that, not only in its general influence upon the human mind, but also by the special character of that influence, it is as favorable to the industrial spirit as this is to it. For not only does the general habit of reflexion tend to cultivate those peaceful sentiments which are essential to the success and the continuance of industrial activity, but this activity is rendered all the more successful especially by reflecting on the ultimate significance and end of existence, inasmuch as the conception of that end must give a clearer

direction to all the aims of human exertion, and therefore to the special aims of industrial life.

We are thus, however, already carried beyond a purely empirical view of the relation between philosophy and industrial work : for not only do we thus see how industrialism is not inimical to philosophy, but we see philosophy repaying industrialism for its friendly services by opening wider and clearer views of its aims, giving to these something better than the mere impulses of the instinctive struggle for existence, directing them to their proper end by the guidance of reason. Accordingly we are led to inquire, what is the result of turning the light of philosophical reflexion upon the aims of industrial life, or, in other words, what is the view of those aims, which such reflexion suggests. Philosophy, being necessarily occupied with the ultimate meaning and purpose of existence, must, when reflected upon industrial life, endeavor to grasp the supreme end to which the particular aims of industrialism are subservient, as well as the means by which industrialism endeavors to reach that end.

1.

The end of industrial life. It ought to go without saying, that the supreme end of industrial activity must be identical with that of all activity : and yet the fact is one that is but imperfectly recognised, or its significance is but imperfectly understood. The fact is, indeed, strikingly indicated by the common language of industrial life, which has been adopted by economical science. Prevalent phraseology describes industrial life as occupied with the production and distribution of wealth, and this accordingly is said to form the subject of scientific economics : but even scientific explanations of this language are often extremely imperfect, when they are not misleading. The term wealth, by its very etymology, indicates that it properly denotes the condition of weal, of well-being. It is true that, in its ordinary use it is applied rather to external things than to an internal state, and we must of course continue to accept established usage as the criterion of propriety in the application of the term. But if the term is not to be abused by a vagueness which

empties it of all serviceable significance, it must be applied to those phenomena which form the external conditions of human weal.

This is more or less clearly implied in all the scientific definitions of wealth. For in every such definition it is recognised with but slight variation of language, that, in order to make any article a factor of wealth, it must possess the attribute which is technically known as utility: and utility is always explained to mean the adaptation of the article to satisfy some human want. The very terminology thus adopted, however, shows that the industrial aspect of wealth inevitably runs over into the ethical, and that nothing but an incomplete analysis can countenance the practice, which has been common in the political economy of the earlier part of this century, —the practice of drawing an absolute line of demarcation between economical and ethical problems. Again and again we are told in the literature of this period, that the science of economics can view things merely on the side of their utility, and that their utility means merely that they can satisfy any of the wants of men. Many articles, it is admitted, are applied to the gratification of petty vanities or even gross animal passions. It is regretted that men should indulge degrading wants. Economical science does not deny the moral aspect of things, or under-estimate its importance. It simply asserts that the economical is not the moral aspect. It maintains that, as long as men cultivate degrading wants, they will seek the objects by which these are gratified, they will give their labor and other valuable things in exchange for those objects, and such objects will thus, by their utility, possess economical value.

All this reasoning, it required no very stoical morality to avoid. The moralists of the utilitarian school were sufficient to have taught the utilitarian economists a nobler, as well as a more philosophical, conception of utility. For the utilitarian moralists, while giving to utility a definition essentially identical with that of the economists, interpret the definition with a truer, because a far wider, view of its implications. To the moralist, as to the economist, utility is the power of affording gratification: but in general the moralist refuses to admit that the meaning of this definition can be fully understood without taking into view the nature of the gratifications that are

sought. Even for the individual an action cannot be said to have real utility merely because it gives gratification for the moment. The real gratification of any human being must be the gratification derived from life as a whole: and the utility, that is, the goodness, of an action, even for the individual agent, can therefore never be calculated without reference to its motives and consequences. Accordingly, nearly all utilitarian moralists, from Epicurus down to John Stuart Mill, have maintained that our happiness is derived, not so much from the feelings of the moment, as from the fact that

"We look before and after,
And pine for what is not."

But if this is the case even when the question is limited to the individual, it must be much more obvious when the view is extended to society. Not only is it absurd to seek the happiness of certain members or classes without regard to the rest, but the genuine happiness of every community must imply some security for its permanence. In general also utilitarian moralists have endeavored to show,—with what success, need not be discussed,—that the happiness of the individual, when completely analysed, must be identical with that of society.

These considerations have not indeed been overlooked wholly by economical writers, or overlooked by them all: but it is rare to find, among the predominant school of economists in the earlier half of this century, a clear and steady recognition of the scientific truth, that the utility, upon which the economical value of a commodity depends, must involve implications essentially similar to those which characterise the utility that is supposed to determine the moral value of an action. If the utility, which makes an action morally good, must calculate the happiness of an individual's whole life, and even the happiness of the whole community to which he belongs, then, by parity of reasoning, the utility, which ranks a commodity among the economical goods of mankind, which makes a commodity a real constituent of wealth, must point to a happiness of the same wide range. It is the oversight of this reasoning that originates many shallow popular illusions with regard to the economical value of reckless extravagance and vicious indulgences, which stimulate the

production of certain commodities, and thus enable the producers to obtain from the wages of their labor the means of subsistence. It is true that it has become a common-place among economical writers to distinguish productive and unproductive consumption: but the familiarity of this distinction has not prevented even economists from overlooking at times its full significance. Consumption very often gets the credit of being productive if it results in any material product which is exchangeable in the markets of the world, even though the product may be adapted, while giving momentary pleasure, to impair the general happiness and productive power of its consumers, or even though it may be adapted, like the instruments of warfare, to destroy wealth. Thus the impression is gathered from some economical treatises, that a million gallons of whisky may be entered upon the inventory of a nation's wealth equally with a million barrels of flour, or that a million rifles make up the genuine wealth of the world equally with a million reaping machines. Unless this distinction is maintained in all its purport, not only is a color given to the illusions of vulgar thought, but there is no escape from the extravagant theory of the "Fable of the Bees." The very extravagance of this famous book has led some critics—I think, without reason—to look upon it as a bit of irony: but the essentially comical character of its extravagance makes it, whether intentionally or not, an ironical *reductio ad absurdum* of the idea that real wealth can be made up of articles which are inimical to the real, that is, the moral, well-being of a community.

These remarks have been based designedly on the utilitarian interpretation of the moral life, not from any desire to estimate the value of that interpretation, but simply because the language of utilitarian ethics is so naturally suggested by that of economical writers. The whole reasoning of these remarks, however, is independent on any peculiar ethical theory: and probably most thinkers would acknowledge that the reasoning gains force by the abandonment of utilitarianism. It thus appears that, on any ethical theory, philosophy will not allow an absolute separation of the industrial from the moral life of man, and that the wealth, which industry is occupied in producing, can, if genuine, be merely *the sum*

of those external or material conditions which are essential and favorable to morality.

II.

The method or means of attaining the end of industrial life. Wealth can be accumulated only in proportion as it is produced at the least possible cost, and distributed with the least possible waste : that is to say, the economical production and distribution of wealth form the method or means of attaining the end of industrial life. Accordingly the production and distribution of wealth form also the main subjects of economical science. Here again, however, as in the definition of wealth itself, the spirit of philosophy may fairly be called in to enlarge the conceptions with which the science of economy deals.

Thus, to begin with, production and distribution are very often separated with that sharpness of discrimination which is engendered and sometimes even enforced by the limitation of view characteristic of scientific specialism, but which is apt to be blurred, if not obliterated, in the vaster sweep of the philosophical mind, seeking the unification of all knowledge. It is impossible to explain production satisfactorily, as wholly independent of distribution. For, apart from other considerations, if an undue proportion of the wealth produced in any community finds its way into the hands of unproductive consumers, then the productive power of the community is crippled, not only by the want of capital, but also by the fact that a large proportion of the productive laborers are poorly fed, poorly clad, poorly housed, poorly provided with the means of moral and intellectual training, so that their energy as producers is seriously impaired. This has always been in the past, and continues to be at present, the chronic condition even of the most advanced industrial nations, and it forms one of the principal causes which prevent the world from producing the wealth that it might otherwise enjoy. Even, therefore, for the production of wealth, a community cannot be indifferent to its distribution ; and, as a matter of fact, the undefined usages, as well as the definite laws, of all countries, have been largely concerned with the distribution of their wealth.

It will probably be allowed that the general thought, of which such social regulations are an outgrowth, is the idea of a right which a man acquires over any product of nature, when by his labor he communicates to it a utility which without his labor it would not have possessed. Even in communities of the rudest militant type, regulated mainly by

> "The simple plan,
> That they should take who have the power,
> And they should keep who can,"

there appears at times a dim conception of the right which a man acquires to the fruits of his labor, though the conception is perversely applied to labor which deprives another of the same right. At all events it is this right which civilised jurisprudence has endeavored to bring into ever clearer recognition: and what philosophy has to demand of economics is, that it shall not inculcate any industrial arrangement of society which is incompatible with the full recognition of this right. For philosophy, as the unification of all knowledge, the harmony of all the sciences, cannot admit that to be true in one science which is untrue in another. Accordingly the economical aims of society cannot be philosophically represented as out of harmony with the aims which are posited by jurisprudence and ethics: in other words, the production of the aggregate wealth of any community cannot be conceived to be independent on its equitable distribution among the individual members.

Accordingly it becomes an economical problem to devise a method by which the aggregate wealth produced in a community shall be equitably distributed among the producers, even though economical science may state the problem as seeking a method by which the aggregate wealth produced may be so distributed as most efficiently to promote further production. In the solution of the problem the economical theories predominant in the early part of this century, went almost exclusively in the direction of abolishing all restrictions upon individual freedom: and the function of the State in relation to industrial life was confined to restraining individuals from interfering with the freedom of each other. It is not difficult to trace the origin of this movement. It was but a ripple

on a great wave of thought and life, which was already flowing in full tide towards the middle of last century, and before the century closed had, in the irresistible sweep of the American and European revolutions, borne down the barriers erected to stem its progress. The fundamental idea of this movement was an interpretation of the old Stoical concept of *the state of nature*. According to this interpretation man, as well as every other being, is conceived as adapted, by the very constitution of his nature, to promote his own welfare; so that to secure that welfare nothing is required but to allow his nature free play by emancipating it from the artificial restrictions by which its full development is impeded. It is not necessary to illustrate the application of this concept, for example, to the education of the individual in the startling novelties of Rousseau's "Emile," and to the constitution of society in the equally startling paradoxes of his essay on the origin of inequalities among men. The great literary enthusiasm, which emancipated literature from the fetters of a rigid and often frigid classicism by the outburst of a fervid and sometimes eccentric romanticism, was an inspiration of the same movement.

It was the ideas of this movement applied to industrial life that originated the demand for freedom of trade; and in view of the industrial condition of the world at the time such a demand was not only intelligible, but irresistible by any rational thought. In some countries, such as France, it is difficult to understand how industry of any kind continued to survive under the innumerable oppressions of a mediæval thraldom which seem as if they had been designed to crush it out of existence. But even in Great Britain, though its comparative political freedom made it the admiration of the continental liberals, industrial life was fettered by restrictions which not only checked the manufacturing and mercantile enterprise of its own people, but originated the calamitous differences with its colonies, and much of the calamitous discontent of Ireland.

But Rousseau's conception of a state of nature, which logically leads to the abolition of all restrictions upon the industrial freedom of the individual, is philosophically as untenable as the opposite conception of Hobbes, which, by a characteristic logic, associated

itself with the most extreme absolutism in ecclesiastical as well as in political organisation. The truth is, as has been shown in many a literary phenomenon from Proudhon to Count Tolstoi, the theory of Rousseau cannot stop short of an absolute nihilism or anarchism, which denies the right of any social authority to restrict the action of individuals. Consequently, in its application to industrial life, demanding, as it does, an unlimited industrial freedom, the theory becomes unthinkable, that is, self-contradictory, under a complete analysis. For, while assuming that, if men are left to their natural impulses unchecked by any artificial restrictions of society, they will certainly seek and find their true welfare, it stands face to face with the fact, that unrestricted liberty of industrial competition, instead of bringing about an effective, peaceful co-operation among industrial workers, has actually realised a *bellum omnium contra omnes*, which seems to illustrate the theory of Hobbes rather than that of Rousseau with regard to the natural state of man. Now, without attempting even to hint at the manifold problems which this subject suggests, it is obvious that, under all its aspects, the individual must be treated, not as a solitary, but as essentially a member of society, forced into innumerable relations with his fellow-men. This is peculiarly evident in industrial life. Here we see in its most striking forms that division of labor which, from the time of Plato, has been recognised as the essential factor of political organisation. But the result of dividing industrial labor among the different members of the community is, that, as a rule, no individual produces all the necessaries even of his own existence, and that therefore he would be left in partial destitution if he could not supply his wants from the surplus products of the labor of others in exchange for the surplus products of his own. The complications of this industrial exchange, with the complications of divided labor from which they arise, form a familiar commonplace in social science, but a commonplace which it is extremely difficult to realise fully in imagination. Now, the theory of unrestricted individualism contends that all these complicated processes, in which the members of a community co-operate for the production and distribution of their wealth, can be most effectively carried on if each individual is left to act unfettered

by any restrictions of social authority. But the whole movement of industrial life contradicts this contention. It is true, as already remarked, that industrial success demanded the emancipation of industry from burdensome regulations and taxes which were never calculated to encourage productive enterprise. But restrictions of this nature must be distinguished from those which are simply the requirements of such concerted action as is necessary for efficiency in the production, and equity in the distribution, of wealth. For the progress of industrial life, with its ever-increasing complications, is rendering it more and more evidently impossible either for producers or for distributers to fulfil their social functions effectively without some mutual understanding of a more or less explicit kind. The disappearance of the small master-workman, the displacement of small industries carried on with the limited capital of individuals by vast enterprises requiring the united capital of joint-stock companies, the aggregation even of such companies in combinations vaster still :—these are perhaps the most striking features of the industrial era in which we live ; and they are evidence of the growing conviction among the industrial workers of the world, that their work can no longer be carried on effectively except by concerted action taking the place of unrestricted competition.

The extent to which concert in individual activity may be effectively carried forms of course an extremely complicated problem ; and many are deterred from facing the problem as they see lowering behind it the bugbear of Socialism. This name, with the offensive suggestions which it conveys to many minds, is at the same time so vague that it may well be avoided in the present discussion. It may be acknowledged that the name is sometimes unfortunately used to imply an extension of social interference with individual freedom, from which those do well to shrink who feel that the tyranny of society is already sufficiently galling, who feel that the hopes of humanity essentially depend on the development of individual responsibility and on the social order securing the free play of individual genius. But the establishment and enforcement of regulations to secure co-operation among industrial workers, and to avoid the enormous waste created by their present antagonisms,

would not in any way interfere with the real freedom of individuals. On the contrary, by guaranteeing, in a manner at present impossible, to every honest worker the fruit of his labors by providing him with the necessaries and even the reasonable comforts and luxuries of our material civilisation, it may fairly be assumed that the great body of the industrial army would be delivered from the cruel oppression of the incessant anxieties connected with the present struggle for existence, and would thus win the required leisure for entering into the spiritual inheritance which humanity has already attained, while many an individual, whose genius would be crushed amid the struggles of industrial competition, might enjoy opportunities of a development that would enrich the intellectual and moral civilisation of the world.

Nor is it necessary to assume that, if concerted action take the place of competition, individual or private property should disappear from industrial life. So many of the social virtues are indissolubly connected with the use of property, that it remains extremely doubtful whether the moral evolution of the human race, even when it has touched its culminating point, will eliminate the institution from society. In the pleasant academical circle which Epicurus gathered about him in his garden in Athens, a proposal was made to introduce community of property among the members, but it seems to have been at once negatived by the master, as out of harmony with the highest social virtue, implying, as it would, distrust among friends in the friendly generosity of each other. It may be, therefore, that the evolution of society, instead of introducing a forcible, external, legal communism, will rather inspire the old concept of property with a new ideal, and that the feverish eagerness with which property is sought under the present system will disappear when larger property, like every superiority over others, will obtrude upon the moral consciousness of its owner, not so much the idea of a right, as rather that of an obligation,—not so much a claim to be ministered unto, but an obligation to minister,—an obligation to place his property and even his life, if necessary, at the service of his fellow-men.

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THE MESSAGE OF MONISM TO THE WORLD.

WE LIVE in an age of the intensest mental growth. Science penetrates deeper and deeper into the secrets of being, teaching us at the same time the conditions of improvement and progress; while the results of our more complete insight into the nature of things have matured our whole trend of thought and rendered our world-conception more sober, more positive, and clearer. The new philosophy which is dawning upon mankind has been briefly called Monism, or the theory of oneness, which indicates that the world, we ourselves included, must be conceived as one great whole. All generalisations, such as matter, mind, and motion, are abstractions representing aspects of reality, but not entities or things-in-themselves by a combination of which the universe has been pieced together; and all our notions of nature can be formulated in exact statements, which, when properly understood, form one harmonious system of natural laws. Monism is the product of the scientific tendencies of our age; it is the principle that pervades them; it is their consummation, and in it the spirit of modern science is concentrated, as it were, in its quintessence. As such, Monism not only forms a centre for the various specialties of scientific research, throwing light upon their interrelations and their aims, but is also destined to penetrate the public mind, to rally, to render judicious, and to direct all efforts at reform, and to regenerate our entire spiritual life in all its various fields. We ask, therefore, what is the message of Monism to the world, and how can it quicken the main-springs of our social, ethical, artistic, and religious aspirations?

Philosophy is not mere theory; it is not an elaboration of ideas

without practical consequences; philosophy shapes our world-conception, and our world-conception gives color to our whole frame of mind and powerfully influences all our actions. Thus, it is the basis of all our thoughts and inclinations. It is the vital centre of our entire being, and only those ideas which touch it are of a sweeping importance. No progress is stable unless it begins here, and no reform is thoroughgoing unless it plunges its roots into these deepest convictions of our soul.

Monism has to struggle for existence, and must overcome the powers which still sway the mass of mankind. And these powers are very strong,—not because they possess much vitality, for they are dying off, and present the sad spectacle of stagnant indifference, but because they hang like a dead weight on the minds of men; their strength is the inertia of massive mountains, the organised life of which has been ossified in palæontological fossils. The era of transition, having given rise to many abortive endeavors to find a way of escape from the pharisaical dogmatism of the old supernaturalism, has ended in the intellectual death of philosophy, which has become satisfied with the negations of an indolent Agnosticism.

In discoursing upon Monism, I do not speak *pro domo*, I do not refer to my own philosophy, but mean that whole great movement in the realm of human thought which endeavors to work out a systematic world-conception upon the basis of a methodical observation of facts. On the other hand, when I speak of Agnosticism as being indolent, I here deliberately exclude both the inventor of the term and its chief representative. Far be it from me to brand their personal endeavors as indolent or to be blind to the great merits of their life-work. I cannot help, however, saying that their philosophical doctrines exercise a pernicious influence, which is obviously productive of indolence and indifference. Thus be it understood that when I speak of Agnosticism I mean the attitude of surrender which writes upon its colors the desperate motto *ignorabimus*, and maintains that the fundamental problems of life are unanswerable riddles.

Monism does not deny that there are and always will be unsolved problems; it is not the proclamation of a dogmatic omniscience; it simply maintains that knowledge is possible, and that the problems

which confront us, among them the very important practical problems of the principles of ethics, the ultimate authority of moral conduct, the nature of the soul and the destiny of the soul after death, are by no means unsolvable. Agnosticism, in rejecting the dogmas of our religious traditions, denies that we can know anything at all about God, soul, and immortality. Thus it discredits investigation, and, leading us into a blind alley, arrests intellectual progress. And so convenient is this attitude concerning the most important problems, the solutions of which, if boldly pronounced, are apt to give offence in some way or other, that the indolent and indifferent of all parties assume it; above all, the representatives of reaction parade it with an ostentatious pretence of breadth and liberalism. The natural consequence of it is that the children of our time have become shallow and exhibit a lamentable lack of character, which appears in the methods of education, in the productions of art, in the religion of our churches, and in the principles of moral conduct. Monism has a word to say on all these subjects. Monism does not overthrow the old traditions; it does not begin the world *ab ovo*; it does not destroy the harvest of millenniums. On the contrary, it embodies in itself the rich experience of past ages; it gathers the golden sheaves in its garners; it only winnows the wheat from the chaff, rejecting the false, the irrational, the hypocritical, the dead letter, and preserving the good, the true, and the truly religious. It prunes the future growth, it systematises, purifies, and elevates. It renovates the old faith; it transforms childlike dreams into distinct conceptions, and changes the fairy-tales of our religious hopes into scientific truths, pregnant with manly resolutions and fixed determinations. Thus, Monism brings into the world a new faith, which undertakes to move the mountains of agnostic incompetence and fashionable indifference.*

* My agnostic friends say that I am prejudiced against agnosticism, and that I do not understand its proper meaning. I repeat here what I have said on former occasions, that I am an adherent of the agnosticism of modesty, which remains conscious of how little we know, but I object to the agnosticism of arrogance, whose devotees dogmatically declare, "We do not know, and thus no one can know." It is true enough that the world as a whole and in all its details is wonderful; here we are, and here is the world in which we have developed; and we say with Goethe: "*Zum Erstaunen bin ich da!*" If that be the meaning of agnosticism, I

The message of Monism appeals to every man who is serious in the investigation of truth, and its applications to practical life are important. Laborers are wanted in all the various fields of human exertion.

Permit me here to sketch the suggestions of this message in three great fields: first, in the domain of practical psychology touching questions of education, the judiciary, and the treatment of criminals; secondly, in the domain of public life, choosing for special consideration the much neglected topic of art; and lastly, in the religious field of our church institutions.

I.

The central problem of psychology is concerned with the nature of the ego-conception. There are the ideas, "*I* think; *I* feel pain; *I* feel pleasure; *I* desire to do this, and it is *I* who do it." And by *I* we understand this whole personality of ours. The old psychology assumes the existence of a mysterious soul-entity which acts the part of the ego and is supposed to be the agent of our psychical activity. We need not enter here into a detailed explanation of all the difficulties into which this view implicates us, for they are innumerable and insurmountable, so that the last refuge of those who hold it is the agnostic position that the problem of the soul is too

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am an agnostic. But our agnostic philosophers do not dwell on this feature of existence; in fact, I do not know that they mention it. Their explanation of agnosticism is different. An event, or a natural law, or any phenomenon, such as a rainbow, may be wonderful, glorious, astonishing, dazzling, or strangely surprising, and yet perfectly intelligible and comprehensible. This, in my opinion, is actually the case with existence. The world as a whole, the cosmic order and every detail of reality, is wonderful yet at the same time perfectly intelligible, and here I differ from the agnostic position. Agnosticism declares that existence is incomprehensible, and that the fundamental problems of existence, such as the existence of God, the nature of the mind, the origin of consciousness, the relation between soul and body, are absolutely unsolvable. This produces a comfortable but vain self-sufficiency in the minds of those who are either unwilling or unable to think a problem to the end; it acts as a check on progress and surrounds confusion of thought with a halo of apparent philosophical sublimity. See *Homilies of Science*, "The Questions of Agnosticism"; *Fundamental Problems*, "The Stronghold of Mysticism," pp. 213–220 and passim. See also the controversy on agnosticism in No. 212 of *The Open Court*. Concerning such questions as the squaring of the circle see *Fundamental Problems*, Second Edition, p. 283, "The Unsolvable Problem," and p. 291, "The Unanswerable Riddle."

deep for solution. A monistic psychology has no room for a metaphysical ego-entity; it shows with good arguments and proves by experiments, of which the most striking ones have been collected by Monsieur Ribot in his excellent psychological memoirs, that the idea of an ego-entity is an illusion. The thought "I" is one idea among many others, having grown into prominence by its frequent occurrence. The soul of man is comparable to a society or an organised state, the citizens of which are so many ideas, impulses, and volitions. At first sight this new soul-conception appears appalling, for it seems to be a negation of the existence of the soul, and it has actually become customary to characterise it as the psychology without a soul. This, however, is not so. The new psychology denies only an unwarranted assumption which, if it were true, would not add an iota to the dignity of the human soul; it only rejects an error, it protests against a superstitious, and, what is more, an injurious, misconception. The change which it brings about is similar to the advance of astronomy from the old Ptolemaic view, which mistook the earth for the centre of the world, to the Copernican system which regards it as one of the planets revolving around the sun. The illusion of the stability of the ego at the centre of our psychic activity is dispelled, but the reality of our soul remains the same as before. On the contrary, the world of mental life is extended not less than the new conception of the astronomical heavens; and the traditional dogma of immortality appears in a new light more glorious, more comforting, more elevating than the fantastic notion of a continued ego-existence in a heaven beyond the clouds.

The negation of the existence of the ego-entity, which many psychologists identify with the soul, is as old as Buddha and perhaps older; yet the application of this truth in the domain of religion is little appreciated and even misunderstood. Its representatives, as a rule, press only the negative side of this view, probably because they do not see the positive side and its great importance. It is as if some myth-poet had personified the day and spoke about it as the bearer of the sunlight, or the "subject" of which all the phases of solar radiance, from morning to night, were phenomenal aspects. Should, now, a philosopher come and explain the nature

of the day, declaring that day is not a subject of phenomenal events, not a bearer or metaphysical entity but only a name for a series of events, he might be denounced for nihilism and suspected of believing in the non-existence of light. Those who believe that day is an entity, regard sunset as the death of day. But in the soul-conception of monism death disappears as much as sunset ceases to be an event that touches the sun.

The practical applications of the new psychology demand, and have even partly brought about, a revision of our entire system of education from infancy to the psychical dietetics of the adult. We want poets who will give us in the place of the old silly doggerels new nursery rhymes, pictures and simple stories conveying instruction as well as moral truths in a telling way. No doubt improvements have been made, but we still look in vain for a model picture-book, perfectly adapted for babes just beginning to speak. Grimm's and other fairy-tales for children will have to be revised, but the revision must be made with an artist's hand; their beauties will have to be retained while their monstrosities must be removed or at least toned down. New tales must be added. The child of to-day who is accustomed to railway travelling and to the sight of machinery will be interested to hear, for example, that there was a time when no engines existed, and that the little boy who once watched the steam of the tea-kettle lift its lid, when he became a man invented the boiler and the cylinder in which the confined steam drives the piston and makes it perform work. It is not easy to reduce the experiences which most of us have had in later life to simple expressions fitted for the comprehension of children, but it is possible and necessary.

The methods of school instruction must be improved. When our educators consider the nature of mind and its growth from sense-impressions, they will, as much as possible, confront the pupil with facts. The principle of teaching by object-lessons must be carried up to the highest branches of physics and mathematics, not omitting languages. Train not only the mind by theories, but impart sensations. Have plenty of illustrations. Use to advantage wherever feasible the magic lantern in geography, in history, in

literature, and art. Teach Latin and Greek syntax in little stories which when learned by heart will naturally and without effort make the pupil apply grammatical rules correctly. It is possible to teach any language, Latin, Greek, or Hebrew, to a youth of average intelligence within a year so that he shall be able to understand it when spoken, and to read and write it. To train the ear by listening to the spoken language, the eye by the sight of printed words, the hand by writing them, and the mind by the abstract comprehension of rules, all at once, is in the long run not more difficult, but easier—namely, easier to the pupil—than a one-sided instruction. In the same way a long sentence of about three lines is more easily remembered than three disconnected words. The home work of our children can be greatly reduced if knowledge is imparted in a systematic and more impressive way. The problem is simply a matter of improved method, of building everything upon the strong foundation of a vivid sense-experience, of invoking the mutual assistance of the senses, and of concentrating all efforts upon points of practical importance. While we should expect more intensified work of our teachers we must at the same give them more leisure for preparation and study.

Splendid beginnings have been made with gymnastics and manual training, but they ought to be generally applied and need not be confined to manual training-schools and technical institutes.

Let us have less work and fewer lessons but more clearness in the presentation of the subjects of instruction in our schools. Drop what is redundant and introduce what is indispensable. Mathematics as a rule is too much neglected and where it is taught should receive more life and fervor. Mathematics need not be so dry and tedious as it is commonly regarded. A mathematical teacher should awaken in his scholars a holy enthusiasm for this most beautiful and divinest of sciences.

We must also change our attitude towards errors, mistakes, vices, and crimes. The old idea of retaliatory justice has been replaced by the two greatest religious teachers of the world, by Buddha and by Christ, who put in its stead an all-embracing compassion for the suffering. They taught a doctrine which has but lately been under-

stood. The monistic philosophy, it can truly be said, has discovered the scientific basis of Christian ethics. The principle of egotism has commonly been regarded as the natural law of moral conduct, and the higher view of superindividual maxims, it was claimed, could not have been naturally developed; it must have been proclaimed by a supernatural revelation. Monism, by dispelling the illusion of the ego, points out the way to a nobler system of ethics, not based upon supernatural revelations that stand in contradiction to the facts of nature but upon the higher evolution of nature in her best children who understand their mother better than do the lower and less perfected creatures, who thus in fact stand nearer to nature, and in this sense are more natural than they. Our modern world-conception considers that the criminal is the product of conditions. It may be necessary to shoot a tiger that is at large, but there is no sense in punishing him because he killed a man. Criminals have been classed with the insane, and treated as morally diseased. The amputation of an ulcerated or cancerous limb is no punishment of the limb, but a cure to protect the other limbs and save the life of the man. It must be remembered that we do not advocate a humane treatment of criminals from sentimental reasons which in their application often lead to a gross injustice toward those who suffer from the folly and brutality of criminals. We simply take the ground of treating men as we treat things, viz., according to their nature without any ill-will or hatred. I remember the lesson which I received while living in Europe from an old French landlady who in anger smashed a Chinese vase because she could not remove a stain as quickly as she wanted to. How often does the retaliatory justice of a barbarous past still lingering with us, destroy human souls from mere impatience.

Punishment is only justified as an educational or protective means, and as such, it ceases to be punishment in the original sense of the word. We have learned with Christ to hate sin while not hating the sinner, and to treat him with all the regard that his humanity demands

II.

Monism has not yet been able to exert its wholesome influence upon the public life of society and politics. We should always bear in mind that in the end all our institutions must serve to develop a higher humanity in man, more manliness, a prouder self-reliance, independence of character, better information, and nobler ideals. It is good for us Americans that we suffer from the ignorance of our voters, but we must not be satisfied with the present conditions. On the one hand, let us remove from our public life the temptations of the spoils-system, which often actually places a premium upon dishonesty, and favors the unscrupulous party-politician. On the other hand, let us consider that our republican institutions can be preserved only on the condition of a general progress of the intelligence and moral firmness of the average man.

Among many other reforms we demand a regeneration of the spirit of art. Art at present is degraded; it has become mere fashion and the representation of empty elegance. Technicalities have become the standard of artistic beauty, while philosophical depth and religious earnestness are omitted and almost discredited.

In former times the world-conception of the age sought embodiment in lofty creations of art. Every piece of art was the expression of the spirit of the times. Art was holy to the Egyptians, to the Greeks, to a Michael Angelo, a Holbein, a Dürer. The religion of the ancient artists speaks to us from the wonderful works of their hands. What is the art of to-day? It consists in the production of beautiful forms wrought out with refined skill by able artificers, but it is void of ideas, possesses no holy zeal, and is utterly lacking in meaning and purport. Why is there no Shakespeare living among us now, no Goethe, no Schiller? It is not because the necessary talent is absent in our young men, but because there is no demand for a poetry that will undertake to teach mankind and reflect the deepest philosophy of the day in a form in which it would be directly and intuitively understood. We cannot say that the people at large are averse to a treatment of the deepest

problems, for even comparatively weak novels on religious, philosophical, and social problems have proved a great temporary, although on account of their shortcomings, not a lasting success. The truth is, that our leaders in literature, our critics, our prominent artists, are infected with the Agnosticism of our age. As Agnosticism has pooh-poohed the manliness of having a definite conviction, the characteristic feature of the art of our age is to be void of character.

The first step toward this sorry condition of art was taken by a great man in a mistaken zeal for the liberation of art from the dogmatic world-conception of an antiquated and narrow-minded theology. Lessing pronounced in his great work on Laöokoön the principle that art should be devoted to the representation of the beautiful and must not be subjected to the censorship of the moralist, who would only use it for the exposition of a bigoted Sunday-school morality. Lessing branded all creations of art that sought to be inspired by philosophical or religious ideals as tendency- or purpose-productions. With apparent justice he claimed art for art, dedicating the beautiful to the beautiful, and leaving the elaboration of truth to science and philosophy, or to religion. He was actuated in the enunciation of his erroneous principle by his zeal against the ruling dogmatism of his age, which actually choked all true art. Lessing did not consider that the beautiful cannot be separated from the true; that while the unreal may be sublime and noble, nay, even true, the untrue is always ugly; and that if art, by showing us the world or some part of the world, the inanimate nature of landscapes or the psychic nature of our souls, in the transfiguration of beauty, did not teach and instruct us, if it did not purify and elevate our minds, it would be like a sounding brass or a tinkling cymbal. Art ceases to be art and is mere artificiality as soon as it is nothing but beauty without truth, form without idea, pleasing creations without meaning.

The best refutation of Lessing's principle is given by himself; for as a poet he disregarded his own rules; and his best works, if not all, would have to be condemned as purpose-dramas. What are "Nathan the Wise," "Minna of Barnhelm," "The Jews," but

works of art that have a very obvious purpose; they teach moral lessons and are unmistakable expressions of his world-conception. The same is true of all other great dramas, such as "Antigone," "Hamlet," "Faust"; which were not written merely to make a display of literary beauty, but to incorporate the deepest religious and philosophical convictions of their poets. They please and teach at the same time; and concerning Lessing's dramas we know for certain that he actually intended them not so much to please as to teach. According to his own confession he used the stage as his pulpit.

It is a shame and a testimonial of our intellectual poverty that such senseless pieces as "The Babes in the Wood," and even worse productions, have been played to crowded houses, that they were praised by the press, and could be repeated in all our great cities more than a hundred times. Would that some wealthy man might found a theatre devoted to true art! The stage could be made a source of spiritual blessings more influential than the church. It would be a powerful factor in the regeneration of our age.

The most prominent philosopher of Agnosticism declares the origin and nature of art to consist in "the useless and superfluous exercise of human faculties." He identifies art with sport, from the practices of which he selects his explanatory examples, and finds the standard of its evolution-begotten perfection in its increasing complexity. From this conception of art the soul is gone; the only thing left is the skill of physical and mental acrobats. An organ solo would be superior to the playing of a piano, because the former is more complex, for while the pianist uses his hands only, the organist has to use also his feet; and the clown who plays the fiddle on horseback would rank higher than Paganini. Such is the agnostic idea of art! Since Agnosticism renders a positive conviction as to the nature of existence impossible, it is consistent with its main principle to take away from art its innermost meaning, its very soul and sacred purpose, which consists in being the expression of a world-conception. We children of a transitional age of indefiniteness are so imbued with this lack of character that the emptiness of our art-productions does no longer surprise us. The present generation, it seems, has lost the proper understanding for true art, because the

world-conception of the masses has become an empty blank; and there is no hope of reform until we regain for our convictions the religious earnestness and ardor which distinguishes all the great artists of former ages.

III.

If Monism is true, our entire religious life will have to undergo a radical change. The dual system of religious truth and scientific truth must go. We must face the fact that there is but one truth and that all different truths are but aspects of that one truth. Science is a religious revelation equally as grand as the Psalms of David and assuredly not less reliable than the visions of St. John.

Our religious leaders must recognise the principle of scientific investigation as the proper method of ascertaining religious truth. The churches must abandon the imposition of pledging the clergy to special dogmas; they might at their ordination pledge them to a reverence of the traditions of their special creeds, but should demand no higher vow than an allegiance to truth.

The present system of many great ecclesiastical institutions deliberately makes hypocrites of the teachers of the people, for it enjoins upon their consciences in a most solemn way some old-fashioned and indeed ridiculous tenets which it is impossible for any sane person of the present century to countenance. Not even the Archbishop of Canterbury can be suspected of believing all the thirty-nine articles of his church, and if he does, he has either to interpret their original meaning away, or to stretch his conscience.

The churches have to be broadened, but, on the other hand, our secular aspirations after progress have to be impressed with a religious spirit. The liberalism of our times, good as it is in its principles, often pursues wrong aims. Thus, in the interest of a strict impartiality toward all religions, ordinances are in force in some of the United States, which forbid the reading of the Bible in public schools. Can the interdiction of the most important collection of sacred literature that exists be called liberty? True, the idea is, not to let the children be impressed with any one of the various sectarian interpretations of the Scriptures, but shall our young men and wo-

men for that reason remain entirely ignorant of the contents of the Bible? The consequence is, that in this country where the mass of the people are unchurched, more than fifty per cent have never read the Bible; and truly, we might rather omit Homer or banish Shakespeare than the History of Israel, the Psalms, and the Gospels. I know the difficulty lies in the sectarian spirit in which our various sects want the Bible read, and its miracles literally believed, but why not let the churches give their own interpretation in their Sunday-schools while the public educational institutions give simply an exposition of facts.

We suggest going further still: not only from the Bible but also from the sacred literature of other religions should selections be read. There are some beautiful passages in the Koran, there is the magnificent Bhagavadgîtâ of the Hindus, there is the Tâo Tĕh King of Lâotsze, full of Christian ethics, although written six hundred years before Christ; there is the Buddhist Dhammapada, the sentiments of which are throughout as lofty as the most glorious passages of the New Testament. All these sacred writings should be household books in our homes, schools, and universities. Together with the Bible they should all be read, reread, and studied with diligence, for they offer us the spiritual bread that is needed so much in our public and private life.

It has been claimed that it is impossible to study religious subjects with impartiality, but why should it be so? If it is impossible now, we must make it possible. What has not been said to be impossible that afterwards has become an actual fact? We have had in this city that memorable gathering of the World's Parliament of Religions, which is a most wonderful event in history, the lesson of which has not as yet been generally learned or even appreciated. If our people understand its lessons they will not hesitate to teach religion in our public schools with all the impartiality that the love of truth demands.

It is quite possible to write a text-book adapted to the capacity of our children in the public schools which in large outlines would characterise the great religious systems of the world so that no one of their adherents would have cause to find fault with the statement,

and which at the same time would contain selections from the various sacred literatures. Shall we forbid the eating of bread because it is liable to become mouldy and poisonous? No, let us show our impartiality not by suppressing the most important discipline but by teaching the facts, so far as they are undeniable, in a way adapted to the age of the pupils and with due discretion so as to avoid unnecessary offence. But under all circumstances let truth be the ultimate tribunal of appeal.

Monism does not advocate a revolution in religion but a reform; yet the reform must be radical; it must dispose of all falsehood at the roots of our religious life.

Let me here express my conviction that the intellectual life of our ecclesiastical institutions is not as dead as it frequently appears to outsiders. The churches still contain powerful potentialities. Any one who cares to investigate matters will observe the thriving and sprouting of promising germs that are developing higher forms of religious life. There exist religious thinkers who take their stand upon the properly religious maxims of religion, who rigorously follow the truth, not only in judging themselves, but also their religious ideas, and in investigating the records of the Bible; who discriminate between the essential and accidental, and find the orthodox solution of difficulties not in the literal acceptance of the letter but in the spiritual meaning of the sacred traditions. They must in the end find the right solution of the religious problem, and will then be able to meet the demands of the so-called infidel world, which is slowly but surely learning to recognise the subtle but very real truths of spiritual and moral laws that obtain in nature.

While there are unmistakable symptoms of progress in many of our old established institutions, it is strange that the most liberal churches sometimes appear the most timid. They halt in their advance as though they were afraid of falling a prey to negativism. This is perhaps the reason why the Unitarianism of to-day shows less vitality than in the days of Channing and Parker. Our Unitarians and the other liberal churches must learn how to be conservative and progressive at the same time. Nor must they be afraid of struggle. Those movements only which have an aim, which are

inaugurated to do some work, which struggle for a cause and pursue an ideal, can be said to be living powers in the world.

There is a widely spread preconception on the subject of religious reform which is that if we begin at all it will finally lead to the utter extinction of religion. But we beg to differ from this view. We consider it as a necessity to carry reform, as demanded by science, to its most radical extreme. Religion will not suffer, but, on the contrary, be purified. The essence of all religion lies in the practical application of truth; the sole purpose of religion is to teach man ethics, to make him a moral enthusiast, to point out to him the way to salvation. And there is no other saviour but truth. Now there is no religion, be its dogmas ever so crude and irrational, but has in it the potentiality of developing into a religion of truth. There is no religion, be it ever so low, that does not purport to be, and can become, an ethical religion. Let but Christianity be true to the spirit of reform which Christ's injunctions breathe, and it will be found to be true. Many of those Christians who call themselves orthodox, spurn the search for truth undertaken by science for the sake of dogmas founded upon the views of well-intentioned but narrow-minded and ignorant men. They have nothing of the spirit of Christ. Verily, he who trusting in truth and believing in the oneness of truth embraces the simple faith in a religion of truth, is a better Christian than all the Christians in name. He is truly orthodox, that is, of right faith; he may discard the letter of Christianity, yet he preserves the spirit; he may protest against the literal interpretation of its mythology, yet he possesses its meaning; he may not be baptised, yet Christ's ideal of a superindividual life lives in his heart; the ethical faith of the religion of truth alone—of scientifically provable truth is—catholic, for no truth is catholic except it be demonstrated by science.

Monism bids the religious thinker be bold and use fearlessly his natural right, or rather obey his duty, of free investigation. The meaning of the old religions is true enough. What renders them objectionable is a clinging to the allegories of their faith and an unthinking acceptance of the symbol as if it were the truth itself. As soon as our churches begin to take the spirit of their religion seriously and to throw off the paganism of a worship of the letter, they

will develop a higher orthodoxy, which can never come in conflict with science and will exhibit an unexpected agreement with the conclusions of a most radical and fearless Monism.

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The new world-conception grounded upon the facts of experience as stated with the scrupulous methods of exact science and systematised by a positive and monistic philosophy, throws light upon all the provinces of human exertion. It brings into full consciousness many aspirations which have so far only been the expression of instinctive promptings. It helps us to understand the nature of our own self, the destiny of our life, and the aim of our holiest ideals. It gives direction to all our yearnings and fulfils all legitimate hopes; it gathers the harvest of the past, and brings everything to a consummation, which, however, will only be the starting-point of a higher development with broader outlooks and infinitely greater possibilities in all the domains of human exertion.

EDITOR.

MONISM IN ARITHMETIC.

IN HIS "Primer of Philosophy," Dr. Paul Carus, the able editor of this magazine, defines monism as a "unitary conception of the world." Similarly, we shall understand by monism in a science the unitary conception of that science. The more a science advances the more does monism dominate it. An example of this is furnished by physics. Whereas formerly physics was made up of wholly isolated branches, like Mechanics, Heat, Optics, Electricity, and so forth, each of which received independent explanations, physics has now donned an almost absolute monistic form, by the reduction of all phenomena to the *motions* of molecules. For example, optical and electrical phenomena, we now know, are caused by the undulatory movements of the ether, and the length of the ether-waves constitutes the sole difference between light and electricity.

Still more distinctly than in physics is the monistic element displayed in pure arithmetic, by which we understand the theory of the combination of two numbers into a third by addition and the direct and indirect operations springing out of addition. Pure arithmetic is a science which has completely attained its goal, and which can prove that it has, exclusively by internal evidence. For it may be shown on the one hand that besides the seven familiar operations of addition, subtraction, multiplication, division, involution, evolution, and the finding of logarithms, no other operations are definable which present anything essentially new; and on the other hand that fresh extensions of the domain of numbers beyond irrational, imaginary, and complex numbers are arithmetically impossible. Arithmetic may be compared to a tree that has completed its growth,

the boughs and branches of which may still increase in size or even give forth fresh sprouts, but whose main trunk has attained its fullest development.

Since arithmetic has arrived at its maturity, the more profound investigation of the nature of numbers and their combinations shows that a unitary conception of arithmetic is not only possible but also necessary. If we logically abide by this unitary conception, we arrive, starting from the notion of counting and the allied notion of addition, at all conceivable operations and at all possible extensions of the notion of number. Although previously expressed by Grassmann, Hankel, E. Schröder, and Kronecker, the author of the present article, in his "System of Arithmetic," Potsdam, 1885, was the first to work out the idea referred to, fully and logically and in a form comprehensible for beginners. This book, which Kronecker in his "Notion of Number," an essay published in Zeller's jubilee work, makes special mention of, is intended for persons proposing to learn arithmetic. As that cannot be the object of the readers of this magazine, whose purpose will rather be the study of the logical construction of the science from some single fundamental principle, the following pages will simply give of the notions and laws of arithmetic what is absolutely necessary for an understanding of its development.

The starting-point of arithmetic is the idea of counting and of number as the result of counting. On this subject, the reader is requested to read the author's article in the last number of *The Monist* (p. 396). It is there shown that the idea of addition springs immediately from the idea of counting. As in counting it is indifferent in what order we count, so in addition it is indifferent, for the sum, or the result of the addition, whether we add the first number to the second or the second to the first. This law, which in the symbolic language of arithmetic, is expressed by the formula

$$a + b = b + a,$$

is called the *commutative law* of addition. Notwithstanding this law, however, it is evidently desirable to distinguish the two quantities which are to be summed, and out of which the sum is produced, by special names. As a fact, the two summands usually are distin-

guished in some way, for example, by saying a is to be increased by b, or b is to be added to a, and so forth. Here, it is plain, a is always something that is to be increased, b the increase. Accordingly it has been proposed to call the number which is regarded in addition as the passive number or the one to be changed, the *augend*, and the other which plays the active part, which accomplishes the change, so to speak, the *increment*. Both words are derived from the Latin and are appropriately chosen. Augend is derived from *augere*, to increase, and signifies that which is to be increased; increment comes from *increscrere*, to grow, and signifies as in its ordinary meaning what is added.

Besides the commutative law one other follows from the idea of counting—the *associative law* of addition. This law, which has reference not to two but to three numbers, states that having a certain sum, $a+b$, it is indifferent for the result whether we increase the increment b of that sum by a number, or whether we increase the sum itself by the same number. Expressed in the symbolic language of arithmetic this law reads,

$$a+(b+c)=(a+b)+c.$$

To obtain now all the rules of addition we have only to apply the two laws of commutation and association above stated, though frequently, in the deduction of the same rule, each must be applied many times. I may pass over here both the rules and their establishment.

In addition, two numbers, the augend a and the increment b are combined into a third number c, the sum. From this operation spring necessarily two inverse operations, the common feature of which is, that the sum sought in addition is regarded in both as known, and he difference that in the one the augend also is regarded as known, and in the other the increment. If we ask what number added to a gives c, we seek the increment. If we ask what number increased by b gives c, we seek the augend. As a matter of reckoning, the solution of the two questions is the same, since by the commutative law of addition $a+b=b+a$. Consequently, only one common name is in use for the two inverses of addition, namely, *subtraction*. But with respect to the notions involved, the two oper-

ations do differ, and it is accordingly desirable in a logical investigation of the structure of arithmetic, to distinguish the two by different names. As in all probability no terms have yet been suggested for these two kinds of subtraction, I propose here for the first time the following words for the two operations, namely, *detraction* to denote the finding of the increment, and *subtertraction* to denote the finding of the augend. We obtain these terms simply enough by thinking of the augmentation of some object already existing. For example, the cathedral at Cologne had in its tower an augend that waited centuries for its increment, which was only supplied a few decades ago. As the cathedral had originally a height of one hundred and thirty metres, but after completion was increased in height twenty-six metres, of the total height of one hundred and fifty-six metres one hundred and thirty metres is clearly the augend and twenty-six metres the increment. If, now, we wished to recover the augend we should have to pull down (Latin, *detrahere*) the upper part along the whole height. Accordingly, the finding of the augend is called *detraction.* If we sought the increment, we should have to pull out the original part from beneath (Latin, *subtertrahere*). For this reason, the finding of the increment is called *subtertraction.* Owing to the commutative law, the two inverse operations, as matters of computation, fall into one, which bears the name of *subtraction.* The sign of this operation is the minus sign, a horizontal stroke. The number which originally was sum, is called in subtraction minuend; the number which in addition was increment is now called detractor; the number which in addition was augend is now called subtertractor. Comprising the two conceptually different operations in one single operation, subtraction, we employ for the number which before was increment or augend, the term subtrahend, a word which on account of its passive ending is not very good, and for which, accordingly, E. Schröder proposes to substitute the word *subtrahent,* having an active ending. The result of subtraction, or what is the same thing, the number sought, is called the *difference.* The definition formula of subtraction reads

$$a - b + b = a,$$

that is, a minus b is the number which increased by b gives a, or

the number which added to *b* gives *a*, according as the one or the other of the two operations inverse to addition is meant. From the formula for substraction, and from the rules which hold for addition, follow now at once the rules which refer to both addition and subtraction. These rules we here omit.

From the foregoing it is plain that the minuend is necessarily larger than the subtrahent. For in the process of addition the minuend was the sum, and the sum grew out of the union of *two* natural number-pictures.* Thus 5 minus 9, or 11 minus 12, or 8 minus 8, are combinations of numbers *wholly destitute of meaning*; for no number, that is, no result of counting, exists that added to 9 gives the sum 5, or added to 12 gives the sum 11, or added to 8 gives 8. What, then, is to be done? Shall we banish entirely from arithmetic such meaningless unions of numbers; or, since they have no meaning, shall we rather invest them with one? If we do the first, arithmetic will still stick in the strait-jacket in which it is forced by the original definition of number as the result of counting. If we adopt the latter alternative we are forced to extend our notion of number. But in doing this, we sow the first seeds of the science of pure arithmetic, an organic body of knowledge which fructifies all other provinces of science.

What significance, then, shall we impart to the symbol

$$5-9?$$

Since 5 minus 9 possesses no significance whatever, we may, of course, impart to it any significance we may wish. But as a matter of practical convenience it should be invested with no meaning that is likely to render it subject to exceptions. As the form of the symbol $5-9$ is the form of a difference, it will be obviously convenient to give it a meaning which will allow us to reckon with it as we reckon with every other real difference, that is, with a difference in which the minuend is larger than the subtrahent. This being agreed upon, it follows at once that all such symbols in which the number before the minus sign is less than the number behind it by the same amount may be put equal to one another. It is practical,

* See the article "Notion and Definition of Number" in the last *Monist*.

therefore, to comprise all these symbols under some one single symbol, and to construct this latter symbol so that it will appear unequivocally from it by how much the number before the minus sign is less than the number behind it. This difference, accordingly, is written down and the minus sign placed before it.

If the two numbers of such a differential *form* are equal, a totally new sign must be invented for the expression of the fact, having no relation to the signs which state results of counting. This invention was not made by the ancient Greeks, as one might naturally suppose from the high mathematical attainments of that people, but by Hindu Brahman priests at the end of the fourth century after Christ. The symbol which they invented they called *tsiphra*, empty, whence is derived the English *cipher*. The form of this sign has been different in different times and with different peoples. But for the last two or three centuries, since the symbolic language of arithmetic has become thoroughly established as an international character, the form of the sign has been 0 (French *zéro*, German *null*).

In calling this symbol and the symbols formed of a minus sign followed by a result of counting, *numbers*, we widen the province of numbers, which before was wholly limited to results of counting. In no other way can zero and the negative numbers be introduced into arithmetic. No man can *prove* that 7 minus 11 is equal to 1 minus 5. Originally, both are meaningless symbols. And not until we agree to impart to them a significance which allows us to reckon with them as we reckon with real differences are we led to a statement of identity between 7 minus 11 and 1 minus 5. It was a long time before the negative numbers mentioned acquired the full rights of citizenship in arithmetic. Cardan called them, in his *Ars Magna*, 1545, *numeri ficti* (imaginary numbers), as distinguished from *numeri veri* (real numbers). Not until Descartes, in the first half of the seventeenth century, was any one bold enough to substitute *numeri ficti* and *numeri veri* indiscriminately for the same letter of algebraic expressions.

We have invested thus combinations of signs originally meaningless, in which a smaller number stood before than after a minus sign, with a meaning which enables us to reckon with such *apparent*

differences exactly as we do with ordinary differences. Now it is just this practical shift of imparting meanings to combinations, which logically applied deduces naturally the whole system of arithmetic from the idea of counting and of addition, and which we may characterise, therefore, as the *foundation-principle* of its whole construction. This principle, which Hankel once called the *principle of permanence*, but which I prefer to call the PRINCIPLE OF NO EXCEPTION, may be stated in general terms as follows:

In the construction of arithmetic every combination of two previously defined numbers by a sign for a previously defined operation (plus, minus, times, etc.) shall be invested with meaning, even where the original definition of the operation used excludes such a combination; and the meaning imparted is to be such that the combination considered shall obey the same formula of definition as a combination having from the outset a signification, so that the old laws of reckoning shall still hold good and may still be applied to it.

A person who is competent to apply this principle rigorously and logically will arrive at combinations of numbers whose results are termed irrational or imaginary with the same necessity and facility as at the combinations above discussed, whose results are termed negative numbers and zero. To think of such combinations as *results* and to call the products reached also "numbers" is a misuse of language. It were better if we used the phrase *forms of numbers* for all numbers that are not the results of counting. But *usus tyrannus!*

It will now be my task to show how all numbers at which arithmetic ever has arrived or ever can arrive naturally flow from the simple application of the principle of no exception.

Owing to the commutative and associative laws for addition it is wholly indifferent for the result of a series of additive processes in what order the numbers to be summed are added. For example,

$$a+(b+c+d)+(e+f)=(a+b+c)+(d+e)+f.$$

The necessary consequence of this is that we may neglect the consideration of the order of the numbers and give heed only to what the quantities are that are to be summed, and, when they are equal, take note of only two things, namely, of what the quantity which is

to be repeatedly summed is called and how often it occurs. We thus reach the notion of multiplication. To multiply *a* by *b* means to form the sum of *b* numbers each of which is called *a*. The number conceived summed is called the multiplicand, the number which indicates or counts how often the first is conceived summed is called the multiplier.

It appears hence, that the multiplier must be a result of counting, or a number in the original sense of the word, but that the multiplicand may be any number hitherto defined, that is, may also be zero or negative. It also follows from this definition that though the multiplicand may be a concrete number the multiplier cannot. Therefore, the commutative law of multiplication does not hold when the multiplicand is concrete. For, to take an example, though there is sense in requiring four trees to be summed three times, there is no sense in conceiving the number three summed "four trees times." When, however, multiplicand and multiplier are unnamed results of counting, (abstract numbers,) two fundamental laws hold in multiplication, exactly analogous to the fundamental laws of addition, namely, the law of commutation and the law of association. Thus,

$$a \text{ times } b = b \text{ times } a,$$

$$\text{and, } a \text{ times } (b \text{ times } c) = (a \text{ times } b) \text{ times } c.$$

The truth and correctness of these laws will be evident, if keeping to the definition of multiplication as an abbreviated addition of equal summands, we go back to the laws of addition. Owing to the commutative law it is unnecessary, for purposes of practical reckoning, to distinguish multiplicand and multiplier. Both have, therefore, a common name: *factor*. The result of the multiplication is called the product; the symbol of multiplication is a dot (.) or a cross ($\times$), which is read "times." Joined with the fundamental formula above written are a group of subsidiary formulæ which give directions how a sum or difference is multiplied and how multiplication is performed with a sum or difference. I need not enter, however, into any discussion of these rules here.

As the combination of two numbers by a sign of multiplication has no significance according to our definition of multiplication,

when the multiplier is zero or a negative number, it will be seen that we are again in a position where it is necessary to apply the above explained principle of no exception. We revert, therefore, to what we above established, that zero and negative numbers are symbols which have the form of differences, and lay down the rule that multiplications with zero and negative numbers shall be performed exactly as with real differences. Why, then, is minus one times minus one, for example, equal to plus one? For no other reason than that minus one can be multiplied with an ordinary difference, as, for example, 8 minus 5, by first multiplying by 8, then multiplying by 5, and subtracting the differences obtained, and because agreeably to the principle of no exception we must say that the multiplication must be performed according to exactly the same rule with a symbol which has the *form* of a difference whose minuend is less by one than its subtrahent.

As from addition two inverse operations, detraction and subtertraction, spring, so also from multiplication two inverse operations must proceed which differ from each other simply in the respect that in the one the multiplicand is sought and in the other the multiplier. As matters of computation, these two inverse operations again meet in a single operation, namely, division, owing to the validity of the commutative law in multiplication. But in so far as they are different ideas, they must be distinguished. As most civilised languages distinguish the two inverse processes of multiplication in the case in which the multiplicand is a line, we will adopt for arithmetic a name which is used in this exception. Let us take this example,

$$4\ \textit{yards} \times 3 = 12\ \textit{yards}.$$

If twelve yards and four yards are given, and the multiplier 3 is sought, I ask, how many summands, each equal to four yards, give twelve yards, or, what is the same thing, how often I can lay a length of four yards on a length of twelve yards. But this is *measuring*. Secondly, if twelve yards and the number 3 are given, and the multiplicand four yards is sought, I ask what summand it is which taken three times gives twelve yards, or, what is the same thing, what part I shall obtain if I cut up twelve yards into three equal parts. But this is partition, or *parting*. If, therefore, the multi-

plier is sought we call the division *measuring*, and if the multiplicand is sought, we call it *parting*. In both cases the number which was originally the product is called the dividend. and the result the quotient. The number which originally was multiplicand is called the measure; the number which originally was multiplier is called the parter. The common name for measure and parter is divisor. The common symbol for both kinds of division is a colon, a horizontal stroke, or a combination of both. Its definitional formula reads,

$$(a \div b) \,.\, b = a, \text{ or, } \frac{a}{b} \,.\, b = a.$$

Accordingly, dividing a by b means, to find the number which multiplied by b gives a, or to find the number *with* which b must be multiplied to produce a. From this formula, together with the formulæ relative to multiplication, the well-known rules of division are derived, which I here pass over.

In the dividend of a quotient only such numbers can have a place which are the product of the divisor with some previously defined number. For example, if the divisor is 5 the dividend can only be 5, 10, 15, and so forth, and 0, —5, —10 and so forth. Accordingly, a stroke of division having underneath it 5 and above it a number different from the numbers just named is a combination of symbols having no meaning. For example, $\frac{3}{5}$ or $\frac{1}{5}\frac{2}{}$ are meaningless symbols. Now, conformably to the principle of no exception we must invest such symbols which have the form of a quotient without their dividend being the product of the divisor with any number yet defined, with a meaning such that we shall be able to reckon with such apparent quotients as with ordinary quotients. This is done by our agreeing always to put the product of such a quotient form with its divisor equal to its dividend. In this way we reach the definition of broken numbers or *fractions*, which by the application of the principle of no exception spring from division exactly as zero and negative numbers sprang from subtraction. The latter had their origin in the impossibility of the subtraction; the former have their origin in the impossibility of the division. Putting

together now both these extensions of the domain of numbers, we arrive at *negative fractional numbers*.

We pass over the easily deduced rules of computation for fractions and shall only direct the reader's attention to the connexion which exists between fractional and non-fractional or, as we usually say, whole numbers. Since the number 12 lies between the numbers 10 and 15, or, what is the same thing, $10 < 12 < 15$, and since $10 : 5 = 2$, $15 : 5 = 3$, we say also that $12 : 5$ lies between 2 and 3, or that

$$2 < \tfrac{12}{5} < 3.$$

In itself, the notion of "less than" has significance only for results of counting. Consequently, it must first be stated what is meant when it is said that 2 is less than $\frac{12}{5}$. Plainly, nothing is meant by this except that 2 times 5 is less than 12. We thus see that every broken number can be so interpolated between two whole numbers differing from each other only by 1 that the one shall be smaller and the other greater, where smaller and greater have the meaning above given.

From the above definitions and the laws of commutation and association all possible rules of computation follow, which in virtue of the principle of no exception now hold indiscriminately for all numbers hitherto defined. It is a consequence of these rules, again, that the combination of two such numbers by means of any of the operations defined must in every case lead to a number which has been already defined, that is, to a positive or negative whole or fractional number, or to zero. The sole exception is the case where such a number is to be divided by zero. If the dividend also is zero, that is, if we have the combination $\frac{0}{0}$, the expression is one which stands for any number whatsoever, because any number whatsoever, no matter what it is, if multiplied by zero gives zero. But if the dividend is not zero but some other number a, be it what it will, we get a quotient form to which *no* number hitherto defined can be equated. But we discover that if we apply the ordinary arithmetical rules to $a \div 0$ all such forms may be equated to one another both when a is positive and also when a is negative. We may therefore invent two new signs for such quotient forms, namely $+\infty$ and

$-\infty$. We find, further, that in transferring the notions greater and less to these symbols, $+\infty$ is greater than any positive number, however great, and $-\infty$ is smaller than any negative number, however small. We read these new signs, accordingly, "plus infinitely great" and "minus infinitely great."

But even here arithmetic has not reached its completion, although the combination of as many previously defined numbers as we please by as many previously defined operations as we please will still lead necessarily to some previously defined number. Every science must make every possible advance, and still one step in advance is possible in arithmetic. For in virtue of the laws of commutation and association, which also fortunately obtain in multiplication, just as we advance from addition to multiplication, so here again we may ascend from multiplication to *an operation of the third degree*. For, just as for $a+a+a+a$ we read $4.a$, so with the same reason we may introduce some more abbreviated designation for $a.a.a.a$. The introduction of this new operation is in itself simply a matter of convenience and not an extension of the ideas of arithmetic. But if after having introduced this operation we repeatedly apply the monistic principle of arithmetic, the principle of no exception, we reach new means of computation which have led to undreamt of advances not only in the hands of mathematicians but also in the hands of natural scientists. The abbreviated designation mentioned, which, fructified by the principle of no exception, can render science such incalculable services, is simply that of writing for a product of b factors of which each is called a, a^b, which we read a to the b^{th} power. Here a new direct operation, that of *involution*, is defined, and from now on we are justified in distinguishing operations which are not inverses of others, as addition, multiplication, and involution, by *numbers of degree*. Addition is the direct operation of the first degree, multiplication that of the second degree, and involution that of the third degree. In the expression a^b the passive number a is called the *base*, the active number b the *exponent*, the result, the *power*.

But whilst in the direct operations of the first and second degree, the laws of commutation and association hold, here in involu-

tion, the operation of third degree, the two laws are inapplicable, and the result of their inapplicability is that operations of a still higher degree than the third form no possible advancement of pure arithmetic. The product of b factors a is not equal to the product of a factors b; that is, the law of commutation does not hold. The only two different integers for which a to the b^{th} power is equal to b to the a^{th} power are 2 and 4, for 2 to the 4^{th} power is 16, and 4 to the second power also is 16. So, too, the law of association as a general rule does not hold. For it is hardly the same thing whether we take the $(b^c)^{th}$ power of a or the c^{th} power of a^b.

From the definition of involution follow the usual rules for reckoning with powers, of which we shall only mention one, namely, that the $(b-c)^{th}$ power of a is equal to the result of the division of a to the b^{th} power by a to the c^{th} power. If we put here c equal to b, we are obliged, by the principle of no exception, to put a to the 0^{th} power equal to 1; a new result not contained in the original notion of involution, for that implied necessarily that the exponent should be a result of counting. Again, if we make b smaller than c we obtain a *negative exponent*, which we should not know how to dispose of if we did not follow our monistic law of arithmetic. According to the latter, a to the $(b-c)^{th}$ power must still remain equal to a^b divided by a^c even when b is smaller than c. Whence follows that a to the minus d^{th} power is equal to 1 divided by a to the d^{th} power, or to take specific numbers, that 3 to the minus 2^{nd} power is equal to $\frac{1}{9}$.

At this point, perhaps, the reader will inquire what a raised to a fractional power is. But this can be explained only when we have discussed the inverse processes of involution, to which we now pass.

If $a^b=c$, we may ask two questions: first, what the base is which raised to the b^{th} power gives c; the second, what the exponent of the power is to which a must be raised to produce c. In the first case we seek the base, and term the operation which yields this result *evolution*; in the second case we seek the exponent and call the operation which yields this exponent, the *finding of the logarithm*. In the first case, we write $\sqrt[b]{c}=a$ (which we read, the b^{th} root of c is equal to a), and call c the *radicand*, b the *exponent of the root*, and a

the *root*. In the second case, we write $\log_a c = b$ (which we read, the logarithm of c to the base a is equal to b), and call c the *logarithmana* or *number*, a the *base of the logarithm*, and b the *logarithm*.

While, owing to the validity of the law of commutation in addition and multiplication, the two inverse processes of those operations are identical so far as computation is concerned, here in the case of involution the two inverse operations are in this regard essentially different, for in this case the law of commutation does not hold.

From the definitional formulæ for evolution and the finding of logarithms, namely,

$$(\sqrt[b]{c})^b = c, \text{ and } (a)^{\log_a c} = c,$$

follow, by the application of the laws of involution, the rules for computation with roots and logarithms. These rules we pass over here, only remarking, first, that for the present $\sqrt[b]{c}$ has meaning only when c is the b^{th} power of some number already defined; and, secondly, that for the present also $\log_a c$ has meaning only when c can be produced by raising the number a to some power which is a number already defined. In the phrase "has only meaning for the present" is contained a possibility of new extensions of the domain of number. But before we pass to those extensions we shall first make use of the idea of evolution just defined to extend the notion of power also to cases in which the exponent is a fractional number.

According to the original definition of involution, a^b was meaningless except where b was a result of counting. But afterwards, even powers which had for their exponents zero or a negative integer could be invested with meaning. Now we have to consider the arithmetical combination "a raised to the fractional power $\frac{p}{q}$." The principle of no exception compels us to give to the arithmetical combination "a to the $\frac{p}{q}^{th}$ power" a significance such that all the rules of computation will hold with respect to it. Now, one rule that holds is, that the m^{th} power of the n^{th} power of a is equal to the $(m \times n)^{th}$ power of a. Consequently, the q^{th} power of a raised to the $\frac{p}{q}^{th}$ power must be equal to a raised to a power whose exponent is equal to $\frac{p}{q}$ times q. But the last-mentioned product gives, according to the definition of division, the number p. Consequently the sym-

bol a to the $\frac{p}{q}^{th}$ power is so constituted that its q^{th} power is equal to a to the p^{th} power, that is, is equal to the q^{th} root of a^p. Similarly, we find that the symbol "a to the minus $\frac{p}{q}^{th}$ power" must be put equal to 1 divided by the q^{th} root of a to the p^{th} power, if we are to reckon with this symbol as we do with real powers. Again, just as a to the b^{th} power is invested with meaning when b is a fractional number, so some meaning harmonious with the principle of no exception must be imparted to the b^{th} root of c where b is a positive or negative fractional number. For example, the three-fourthsth root of 8 is equal to 8 to the $\frac{4}{3}$ power, that is, to the cube root of 8 to the 4^{th} power, or 16.

The principle underlying arithmetic now also compels us to give to the symbol the "b^{th} root of c" a meaning when c is not the b^{th} power of any number yet defined. First, let c be any *positive* integer or fraction. Then always to be able to reckon with the b^{th} root of c in the same way that we do with extractible roots, we must agree always to put the b^{th} power of the b^{th} root of c equal to c—for example, $(\sqrt[2]{3})^2$ always exactly equal to 3. A careful inspection of the new symbols, which we will also call numbers, shows, that though no one of them is exactly equal to a number hitherto defined, yet by a certain extension of the notions greater and less, two numbers of the character of numbers already defined may be found for each such new number, such that the new number is greater than the one and less than the other of the two, and that further, these two numbers may be made to differ from each other by as small a quantity as we please. For example,

$$(\tfrac{7}{5})^3 = \tfrac{343}{125} = 2\tfrac{93}{125} < 3 < 3\tfrac{3}{8} = \tfrac{27}{8} = (\tfrac{3}{2})^3.$$

The number 3, as we see, is here included between two limits which are the third powers of two numbers $\frac{7}{5}$ and $\frac{3}{2}$ whose difference is $\frac{1}{10}$. We could also have arranged it so that the difference should be equal to $\frac{1}{100}$, or to any specified number, however small. Now, instead of putting the symbol "less than" between $(\frac{7}{5})^3$ and 3, and between 3 and $(\frac{3}{2})^3$, let us put it between their third roots; for example, let us say:

$$\tfrac{7}{5} < \sqrt[3]{3} < \tfrac{3}{2}, \text{ meaning by this that } (\tfrac{7}{5})^3 < 3 < (\tfrac{3}{2})^3.$$

In this sense we may say that the new numbers always lie *between*

two old numbers whose difference may be made as small as we please. Numbers possessing this property are called *irrational* numbers, in contradistinction to the numbers hitherto defined, which are termed *rational*. The considerations which before led us to negative rational numbers, now also lead us to negative irrational numbers. The repeated application of addition and multiplication as of their inverse processes to irrational numbers, (numbers which though not exactly equal to previously defined rational numbers may yet be brought as near to them as we please,) again simply leads to numbers of the same class.

A totally new domain of numbers is reached, however, when we attempt to impart meaning to *the square roots of negative numbers*. The square root of minus 9 is neither equal to plus 3 nor to minus 3, since each multiplied by itself gives plus 9, nor is it equal to any other number hitherto defined. Accordingly, the square root of minus 9 is a new number-form, to which, harmoniously with the principle of no exception, we may give the definition that $(\sqrt[2]{-9})^2$ shall always be put equal to minus 9.* Keeping to this definition we see at once that $\sqrt{-a}$, where a is any positive rational or irrational number, is a symbol which can be put equal to the product of $\sqrt{+a}$ with $\sqrt{-1}$. In extending to these new numbers the rights of arithmetical citizenship, in calling them also "numbers," and so shaping their definition that we can reckon with them by the same rules as with already defined numbers, we obtain a fourth extension of the domain of numbers which has become of the greatest importance for the progress of all branches of mathematics. The newly defined numbers are called *imaginary*, in contradistinction to all heretofore defined, which are called *real*. Since all imaginary numbers can be represented as products of real numbers with the square root of minus one, it is convenient to introduce for this one imaginary number some concise symbol. This symbol is the first letter of the word imaginary, namely, i; so that we can always put for such an expression as $\sqrt{-9}$, $3.i$.

If we combine real and imaginary numbers by operations of the

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* Henceforward we shall use the simpler sign $\sqrt{\ }$ for $\sqrt[2]{\ }$.

first and second degree, always supposing that we follow in our reckoning with imaginary numbers the same rules that we do in reckoning with real numbers, we always arrive again at real or imaginary numbers, excepting when we join together a real and an imaginary number by addition or its inverse operations. In this case *we reach the symbol* $a + i \cdot b$, where a and b stand for real numbers. Agreeably to the principle of no exception we are permitted to reckon with $a + ib$ according to the same rules of computation as with symbols previously defined, if for the second power of i we always substitute minus 1.

In the numerical combination $a + ib$, which we also call number, we have found the most general numerical form to which the laws of arithmetic can lead, even though we wished to extend the limits of arithmetic still further. Of course, we must represent to ourselves here by a and b either zero or positive or negative rational or irrational numbers. If b is zero, $a + ib$ represents all real numbers; if a is zero, it stands for all purely imaginary numbers. This general number $a + ib$ is called a *complex number*, so that the complex number includes in itself as special cases all numbers heretofore defined. By the introduction of irrational, purely imaginary, and the still more general complex numbers, all combinations become invested with meaning which the operations of the third degree can produce. For example, the fifth root of 5 is an irrational number, the logarithm of 2 to the base 10 is an irrational number. The logarithm of minus 1 to the base 2 is a purely imaginary number; the fourth root of minus 1 is a complex number. Indeed, we may recognise, proceeding still further, *that every combination of two complex numbers, by means of any of the operations of the first, second, or third degree will lead in turn to a complex number*, that is to say, never furnishes occasion, by application of the principle of no exception, for inventing new forms of numbers.

A certain limit is thus reached in the construction of arithmetic. But such a limit was also twice previously reached. After the investigation of addition and its inverse operations, we reached no other numbers except zero and positive and negative whole numbers, and every combination of such numbers by operations of the

first degree led to no new numbers. After the investigation of multiplication and its inverse operations, the positive or negative fractional numbers and "infinitely great" were added, and again we could say that the combination of two already defined numbers by operations of the first and second degree in turn also always led to numbers already defined. Now we have reached a point at which we can say that the combination of two complex numbers by all operations of the first, second, and third degree must again always lead to complex numbers; only that now such a combination does not necessarily always lead to a single number, but may lead to many regularly arranged numbers. For example, the combination "logarithm of minus one to a positive base" furnishes a countless number of results which form an arithmetical series of purely imaginary numbers. *Still, in no case now do we arrive at new classes of numbers.* But just as before the ascent from multiplication to involution brought in its train the definition of new numbers, so it is also possible that *some new operation springing out of involution as involution sprang from multiplication might furnish the germ of other new numbers which are not reducible to* $a + ib$. As a matter of fact, mathematicians have asked themselves this question and investigated the direct operation of the fourth degree, together with its inverse processes. The result of their investigations was, that an operation which springs from involution as involution sprang from multiplication is incapable of performing any real mathematical service; the reason of which is, that in involution the laws of commutation and association do not hold. It also further appeared that the operations of the fourth degree could not give rise to new numbers. No more so can operations of still higher degrees. With respect to quaternions, which many might be disposed to regard as new numbers, it will be evident that though quaternions are valuable means of investigation in geometry and mechanics they are not numbers of arithmetic, because the rules of arithmetic are not unconditionally applicable to them.

The building up of arithmetic is thus completed. The extensions of the domain of number are ended. It only remains to be asked why the science of arithmetic appears in its structure so logi-

cal, natural, and unarbitrary; why zero, negative, and fractional numbers appear as much derived and as little original as irrational, imaginary, and complex numbers? We answer, wholly and alone in virtue of the logical application of the monistic principle of arithmetic, the principle of no exception.

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OUTLINES OF A HISTORY OF INDIAN PHILOSOPHY.

A DISTINCTIVE leaning to metaphysical speculation is noticeable among the Indians from the earliest times. Old hymns of the Ṛigveda, which in other aspects are still deeply rooted in the soil of polytheism, show already the inclination to comprehend multifarious phenomena as a unity, and may therefore be regarded as the first steps in the path which led the old Indian people to pantheism. Monotheistic ideas also occur in the later Vedic hymns, but are not developed with sufficient logic to displace the multiform world of gods from the consciousness of the people.

The properly philosophical hymns, of which there are few in the Ṛigveda, and not many more in the Atharvaveda, belong to the latest products of the Vedic poetry. They concern themselves with the problem of the origin of the world, and with the eternal principle that creates and maintains the world, in obscure phraseology, and in unclear, self-contradictory trains of thought, as might be expected of the early beginnings of speculation. The Yajurvedas, also, contain remarkable and highly fantastic cosmogonic legends, in which the world-creator produces things by the all-powerful sacrifice. It is worthy of notice that the ideas of these portions of the Veda are intimately related with those of the earlier Upanishads, in fact in many respects are identical ; * their connexion is also further evinced by the fact that both in these Upanishads and in the cosmogonic hymns and legends of the Veda the subjects discussed make their

*Compare on this point Lucian Scherman, *Philosophische Hymnen aus der Rig- und Atharva-Veda-Sanhitâ verglichen mit den Philosophemen der älteren Upanishads*, Strassburg–London, 1887.

appearance absolutely without order. Still, the pre-Buddhistic Upanishads, and, in part, also their precursors, the Brâhmaṇas, which dealt essentially with ritualistic questions, and the more speculative Âraṇyakas, are of the greatest importance for our studies; for they represent a time (that extending from the eighth to the sixth century about) in which the ideas were developed that became determinative of the whole subsequent direction of Indian thought:* first and above all, the doctrine of the transmigration of souls, and the theory intimately connected therewith of the subsequent effects of actions (*karman*). The belief that every individual unceasingly moves forward after death towards new existences in which it will enjoy the fruits of formerly won merits, and will suffer the consequences of formerly committed wrongs—whether in the bodies of men, animals, or plants, or in heavens and hells—has dominated the Indian people from that early period down to the present day. The idea was never made the subject of philosophical demonstration, but was regarded as something self-evident, which, with the exception of the Châryâkas, or Materialists, no philosophical school or religious sect of India ever doubted.

The origin of the Indian belief in metempsychosis is unfortunately still much shrouded in obscurity. In the old Vedic time a joyful view of life prevailed in India in which we discover no germs whatever of the conception which subsequently dominated and oppressed the thought of the whole nation; as yet the nation did not feel life as a burden but as the supreme good, and its eternal continuance after death was longed for as the reward of a pious life. In the place of this innocent joy of life suddenly enters, without noticeable evidences of transition, the conviction that the existence of the individual is a journey full of torments from death to death. It is natural enough, therefore, to suspect foreign influence in this sudden revolution of thought.

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*Compare A. E. Gough, *The Philosophy of the Upanishads and Ancient Metaphysics*, London, 1882. The singular unfavorable judgment of the whole philosophy of the Upanishads which Gough pronounces in the opening of his otherwise valuable book, may perhaps be explained by the morbid aversion to all things Indian, which difficult and absorbing work so very frequently produces in Europeans dwelling any length of time in India.

I do not believe that Voltaire's rationalistic explanation of the origin of the Indian doctrine of the transmigration of souls now counts any adherents in professional circles; but it is remarkable enough to merit a passing notice. According to the theory of the ingenious Frenchman the knowledge that the use of meat was upon the whole injurious to health in the climate of India was the ground of the prohibition to kill animals. This originally purely hygienic prescript was clothed in religious trappings and the people thus gradually grew accustomed to reverence and to worship animals. The consequence of the further extension of this animal cult then was, that the whole animal kingdom was felt as a sort of appurtenance to the human species and was gradually assimilated to man in the imagination of the people; from there it was simply a step to accept the continuance of human life in the bodies of animals. This whole hypothesis has long since been rejected, and also several subsequent attempts at explanation must be regarded as unsuccessful.

A suggestion of Gough ("The Philosophy of the Upanishads," pp. 24–25) alone demands more serious consideration. It is well known that the belief that the human soul passes after death into the trunks of trees and the bodies of animals is extremely widespread among half-savage tribes.* On the basis of this fact, Gough assumes that the Aryans, on their amalgamation with the original indigenous inhabitants of India, received from these the idea of the continuance of life in animals and trees. Although this assumption can never be made the subject of proof,† the idea, in my opinion, is

* "The Sonthals are said to believe the souls of the good to enter into fruit-bearing trees. The Powhattans believed the souls of their chiefs to pass into particular wood-birds, which they therefore spared. The Tlascalans of Mexico thought that the souls of their nobles migrated after death into beautiful singing-birds, and the spirits of plebeians into beetles, weasels, and other insignificant creatures. The Zulus of South Africa are said to believe the passage of the dead into snakes, or into wasps and lizards. The Dayaks of Borneo imagine themselves to find the souls of the dead, damp and bloodlike, in the trunks of trees." Gough, following Tylor, *Primitive Culture*, Vol. II, p. 6 et seq.

† One noteworthy passage bearing on this point may be found in Baudhâyana's Dharmaçâstra II. 8. 14. 9, 10, where it is prescribed that dumplings of flour should be thrown to the birds, just as they are offered in the usual ancestral sacrifices, "for it is said that our ancestors hover about in the shape of birds."

very probable, because it explains what no other combinations do sufficiently explain. But we must be on our guard lest we overrate the influence of the crude conceptions of the aborigines. With all tribes low in the scale of civilisation the idea implied in such beliefs is not that of a transmigration of souls in the Indian sense, but simply the notion of a continuance of human existence in animals and trees; with this, reflexion on the subject reaches its goal; further consequences are not drawn from the idea. Under all circumstances, therefore, the Aryan Indians can have received only the first impetus to the development of the theory of transmigration from the aboriginal inhabitants; the elaboration of the idea they borrowed—the assumption of a *constant, changing* continuance of life, and its connexion with the doctrine of the power of deeds, having in view the satisfaction of the moral consciousness—must always be regarded as their own peculiar achievement. The dominating idea of this doctrine is the firm conviction that *unmerited* misfortune can befall no one. On the ground of this conviction an explanation was sought for the fact of daily observation that the bad fare well, and the good fare ill; that animals, and often even the new-born child, who have had no opportunity to incur guilt, must suffer the greatest agonies; and no other explanation was found than the assumption that in this life are expiated the good and bad deeds of a former existence. But what held true of that existence must also have held true of the one which preceded it; again the reason of formerly experienced happiness and misery could only be found in a preceding life. And thus there was no limit whatever to the existence of the individual in the past. The Saṃsâra, the cycle of life, has, therefore, no beginning; for "the work (that is, the conduct or actions) of beings is beginningless." But what has no beginning has by a universally admitted law also no end. The Saṃsâra, therefore, never ceases, no more than it never began. When the individual receives the rewards for his good and his bad deeds, a residuum of merit and guilt is always left which is not consumed and which demands its recompense or its punishment, and, therefore, still acts as the germ of a new existence. Unexpiated or unrewarded no deed remains; for "as among a thousand cows a calf finds its mother, so the previously

done deed follows after the doer," says the Mahâbhârata, giving in words the view which had long since become in India the universal belief. Now, as the cause of all action is desire, desire was declared to be the motive power of the eternal continuance of life. Again, as desire was conceived by the Indian mind to have its root in a sort of ignorance, in a mistaking of the true nature and value of things, in ignorance, it was thought, the last cause of Saṃsâra was hidden. Equally as old is the conviction that the law which fetters living beings to the existence of the world *can* be broken. There is salvation from the Saṃsâra; and the means thereto is the saving knowledge, which is found by every philosophical school of India in some special form of cognition.

The dogmas here developed are summarised by Deussen, "System des Vedânta," pp. 381–382, in the following appropriate words: "The idea is this, that life, in quality as well as in quantity, is the precisely meted, absolutely appropriate expiation of the deeds of the previous existence. This expiation is accomplished by *bhoktritvam* and *kartritvam* (enjoying and acting), where the latter again is converted into works which must be expiated afresh in a subsequent existence, so that the clock-work of atonement in running down always winds itself up again; and this unto all eternity —unless the universal knowledge appears which . . . . does not rest on merit but breaks into life without connexion with it, to dissolve it in its innermost elements, to burn up the seeds of works, and thus to make impossible for all future time a continuance of the transmigration."

What Deussen here expounds as a doctrine of the Vedânta system is a body of ideas which belongs alike to all systems of Brahman philosophy and to Buddhism and Jinism. But the power which inheres in the actions of beings extends, according to the Indian idea, still farther than was stated in the preceding exposition. This subsequent effectiveness of guilt and of merit, usually called *adṛishṭa* "the invisible," also often simply *karman*, "deed, work," not only determines the measure of happiness and suffering which falls to the lot of each individual, but also determines the origin and evolution of all things in the universe. At bottom this last thought is only a

necessary consequence of the theory that every being is the architect of its own fate and fortunes into the minutest details ; for whatever comes to pass in the world, some creature is inevitably affected by it, and must, therefore, by the law of atonement have brought about the event by his previous acts. The operations of nature, therefore, are the effects of the good and bad actions of living beings. When trees bear fruits, or the grain of the fields ripens, the power which is the cause of this, according to the Indian, is human merit.

Even in the systems which accept a God, the sole office of the Deity is to guide the world and the fates of creatures in strict agreement with the law of retribution, which even he cannot break. For the many powers to which the rest of the world, orthodox and unorthodox, ascribe a determinative influence on the lot of individuals and nations as also on the control of the forces of nature,—divine grace and punishment, the order of the world, foresight, fate, accident,—in India there is no place by the side of the power of the work or deed which rules all with iron necessity. On these assumptions all Indian philosophy, with the exception of materialism, is founded.

The most important theme of the early Upanishads, which stand at the head of the real philosophical literature of India, is, as we know, the question of the Eternally-One. The treatment of this question forces all other considerations into the background and culminates in the principle that the Âtman, the innermost self, the soul of the individual is one with the Brahman, the eternal, infinite power which is the ground of all existence. In opposition to this idealistic monism of the Upanishads, Kapila founded the oldest real philosophical system of India in the atheistic Sâṃkhya philosophy, which bears a strictly dualistic character and sees in the knowledge of the absolute difference between mind and matter the only means of attaining the highest salvation, that is, the eternal rest of consciousless existence. The contents of this system have already been sketched in the current volume of *The Monist*, page 177 ; an exhaustive exposition of its principles is given by the author in his work on the "Sâṃkhya Philosophy," Leipsic, H. Haessel.

In all main outlines the Sâṃkhya system supplied the founda-

tions of Buddhism and Jinism, two philosophically embellished religions, which start from the idea that this life is nothing but suffering, and always revert to that thought. According to them, the cause of suffering is the desire to live and to enjoy the delights of the world, and in the last instance the "ignorance" from which this desire proceeds; the means of the abolition of this ignorance, and therewith of suffering, is the annihilation of that desire, renunciation of the world, and a most boundless exercise of practical love towards all creatures. In the subsequent time, it is true, Buddhism and Jinism so developed that some of their teachings were stoutly contested in the Sâṃkhya writings.* These two pessimistic religions are so extraordinarily alike, that the Jaina, that is, the adherents of Jina, were for a long time regarded as a Buddhistic sect, until it was discovered that the founders of the two religions were contemporaries, who in turn are simply to be regarded as the most eminent of the numerous teachers who in the sixth century before Christ in North Central India opposed the ceremonial doctrines and the caste-system of the Brahmans. The true significance of these religions lies in their high development of ethics, which in the scholastic Indian philosophy was almost wholly neglected. Buddhism and Jinism agree, however, with the latter, in the promise, made by all real systems of India, to redeem man from the torments of continued mundane life, and in their perception of a definite ignorance as the root of all mundane evil; but in the philosophical establishment of their principles, both method and clearness of thought are wanting.†

It must also be mentioned in this connexion that the religions

* One question here was of the doctrine of the Jaina, that the soul has the same extension as the body—a thought which is refuted by the argument that everything bounded is perishable, and that this would hold good with all the more force of the soul, as this in its transmigration through different bodies must be assimilated to the bodies that receive it, that is, must expand and contract, a feat achievable only by a thing made up of parts. But the main points attacked are the following views of Buddhism. The Sâṃkhyas principally impugn the Buddhistic denial of the soul as a compact, persistent principle, further the doctrine that all things possess only a momentary existence, and that salvation is the annihilation of self. From this it is plain, that the Sâṃkhyas of the later epoch saw in Buddhism, which nevertheless was essentially an outgrowth of its system, one of its principal opponents.

† Compare especially the Buddhistic formula of the causal nexus in Oldenberg's *Buddha*, Part II, Chapter 2.

of Buddha and Jina have as little broken with the mythological views of the people as the Brahmanic philosophical systems. The existence of gods, demigods, and demons is not doubted, but is of little importance. It is true, the gods are more highly organised and more fortunate beings than men, but like these they also stand within the Saṃsâra, and if they do not acquire the saving knowledge and thus withdraw from mundane existence, must also change their bodies as soon as the power of their formerly won merit is exhausted. They, too, have not escaped the power of death, and they therefore stand lower than the man who has attained the highest goal.* Much easier than the attainment of this goal is it to lift oneself by virtue and good works to the divine plane, and to be born again after death on the moon or in the world of Indra or of Brahman, etc., even in the person of one of these gods; but only foolish men yearn after such transitory happiness.

In the second century before Christ the Yoga philosophy was founded by Patañjali. In part, this event is simply the literary fixation of the views which were held on asceticism and on the mysterious powers which it was assumed could be acquired by asceticism. The Yoga, that is, the turning away of the senses from the external world, and the concentration of the mind within, was known and practised many centuries previously in India. In the Buddhistic communion, for example, the state of ecstatic abstraction was always a highly esteemed condition. Patañjali, now, elaborated the doctrine of concentration into a system and described at length the means of attaining that condition, and of carrying it to its highest pitch. The methodical performance of the Yoga practice, according to Patañjali, leads not only to the possession of the supernatural powers, but is also the most effective means of attaining the saving knowledge.

The metaphysical basis of the Yoga system is the Sâṃkhya philosophy, whose doctrines Patañjali so completely incorporated into his system that that philosophy is with justice uniformly regarded

* This belief in developed, ephemeral gods has nothing to do with the question of the eternal God accepted in some systems. The use of a special word (*îçvara*, "the powerful") in the Indian philosophy plainly grew out of the endeavor to distinguish verbally between *this* god and the popular gods (*deva*).

in Indian literature as a branch of the Sâṃkhya. At bottom, all that Patañjali did was to embellish the Sâṃkhya system with the Yoga practice, the mysterious powers, and the personal god; his chief aim had, no doubt, been to render this system acceptable to his fellow-countrymen by the eradication of its atheism. But the insertion of the personal god, which subsequently decisively determined the character of the Yoga system, was, to judge from the Yogasûtras, the text-book of Patañjali, at first accomplished in a very loose and superficial manner, so that the contents and purpose of the system were not at all affected by it. We can even say that the Yogasûtras I. 23–27, II. 1, 45, which treat of the person of God, are unconnected with the other parts of the text-book, nay, even contradict the foundations of the system. The ultimate goal of human aspiration according to that text-book is not union with or absorption in God, but exactly what it is in the Sâṃkhya philosophy, the absolute isolation (*kaivalya*) of the soul from matter. When L. von Schroeder ("Indiens Literatur und Kultur," p. 687) says: "The Yoga bears throughout a theistic character; it assumes a primitive soul from which the individual souls proceed," his statement is incorrect, for the individual souls are just as much beginningless as the "special soul" (*purusha-viçesha*, Yogasûtra, I. 24) that is called God.

In contrast to these two closely related systems, Sâṃkhya and Yoga, the ancient, genuine Brahmanic elements, the ritual and the idealistic speculation of the Upanishads, are developed in a methodical manner in the two following intimately connected systems whose origin we can place approximately at the beginning of the Christian era.

The Pûrva-(or Karma-)mîmâṃsâ, "the first inquiry," or "the inquiry concerning works," usually briefly called Mîmâṃsâ, founded by Jaimini, is probably counted among the philosophical systems only because of its form and its connexion with the Vedânta doctrine; for it is concerned with the interpretation of the Veda, which it holds to be uncreated and existent from all eternity: classifying its component parts, and treating of the rules for the performance of the ceremonies, as of the rewards which singly follow upon the

latter. This last is the main theme of this system, in which the true scriptural scholarship of the Brahmans is condensed. Questions of general significance are only incidentally discussed in the Mîmâṃsâ. Especial prominence belongs here to the proposition that the articulate sounds are eternal, and to the theory based upon it, that the connexion of a word with its significance is independent of human agreement, and, consequently, that the significance of a word is inherent in the word itself, by nature. Hitherto, the Mîmâṃsâ has little occupied the attention of European indologists; the best description of its principal contents will be found in the "Introductory Remarks" of G. Thibaut's edition of the Arthasaṃgraha (Benares Sanskrit Series, 1882).

The Uttara-(or Brahma-)mîmâṃsâ, "the second inquiry," or "the inquiry into the Brahman," most commonly called Vedânta, bears some such relation to the earlier Upanishads as, to use an expression of Deussen's, Christian dogmatics bear to the New Testament. Its founder, Bâdarâyaṇa, accepted and further developed the above-discussed doctrines of the Brahman-Âtman, into the system which to the present day determines the world-view of the Indian thinkers. This system has received excellent and exhaustive treatment in the above-cited work of Deussen, which is to be emphatically recommended to all interested in Indian philosophy. The basis of the Vedânta is the principle of the identity of our Self with the Brahman. Since, now, the eternal, infinite Brahman is not made up of parts, and cannot be subject to change, consequently our self is not a part or emanation of it, but is the whole, indivisible Brahman. Other being besides this there is not, and, accordingly, the contents of the Vedânta system are comprehended in the expression *advaita vâda*, "the doctrine of non-duality." The objection which experience and the traditional belief in the transmigration of souls and in retribution raise against this principle, has no weight with Bâdarâyaṇa; experience and the doctrine of retribution are explained by the ignorance (*avidyâ*), inborn in man, which prevents the soul from discriminating between itself, its body and organs, and from recognising the empirical world as an illusion (*mâyâ*). The Vedânta philosophy does not inquire into the reason

and origin of this ignorance; it simply teaches us that it exists and that it is annihilated by knowledge (*vidyâ*), that is, by the universal knowledge which grasps the illusory nature of all that is not soul, and the absolute identity of the soul with the Brahman. With this knowledge, the conditions of the continuance of the mundane existence of the soul are removed—for this in truth is only semblance and illusion—and salvation is attained.

In this way are the Brahmasûtras, the text-book of Bâdarâyaṇa, expounded by the famous exegetist Çaṃkara (towards 800 after Christ) upon whose commentary Deussen's exposition is based. Now, as this text-book, like the chief works of the other schools, is clothed in the form of aphorisms not intelligible *per se*, we are unable to prove from its simple verbal tenor that Çaṃkara was always right in his exegesis; but intrinsic reasons render it in the highest degree probable that the expositions of Çaṃkara agree in all essential points with the system which was laid down in the Brahmasûtras. The subsequent periods produced a long succession of other commentaries on the Brahmasûtras, which in part give expression to the religio-philosophical point of view of definite sects. The most important of these commentaries is that of Râmânuja, which dates from the first half of the twelfth century. Râmânuja belonged to one of the oldest sects of India, the Bhâgavatas or Pâñcharâtras, who professed an originally un-Brahmanic, popular monotheism, and saw salvation solely in the love of God (*bhakti*). Upon the Brahmanisation of this sect, their God (usually called Bhagavant or Vâsudeva) was identified with Vishṇu, and from that time on the Bhâgavatas are considered as a Vishṇuitic sect. Its doctrine, which is closely related to Christian ideas, but, in my opinion, was not constructed under Christian influences, is chiefly expounded in the Bhagavadgîtâ, in the Çâṇḍilyasûtras, in the Bhâgavata Purâṇa, and in the text-books proper of the sect, among which we may also reckon Râmânuja's commentary on the Brahmasûtras. According to the tenet of the Bhâgavatas, the individual souls are not identical with the highest soul or God, and are also not implicated by a kind of "ignorance" in mundane existence, but by unbelief. Devout love of God is the means of salvation, that is, of union with the Highest.

The best exposition of the system which Râmânuja imported into the Brahmasûtras will be found in R. G. Bhandarkar's "Report on the Search for Sanskrit Manuscripts during the Year 1883–1884," Bombay, 1887, p. 68 et seq.

As of the systems thus far considered always two are found intimately connected, the Sâṃkhya-Yoga on the one hand, and the Mîmâṃsâ-Vedânta on the other, so also in a subsequent period the two remaining systems which passed as orthodox, the Vaiçeshika and the Nyâya, were amalgamated. The reason of this was manifestly the circumstance that both inculcated the origin of the world from atoms and were signalised by a sharp classification of ideas; yet the Vaiçeshika system is certainly of much greater antiquity than the Nyâya. The former is already attacked in the Brahmasûtras II. 2. 12–17, where at the conclusion the interesting remark is found that it is unworthy of consideration because no one embraced it. But in a subsequent period the system, far from being despised, became very popular.

Kaṇâda (Kaṇabhuj or Kaṇabhaksha) is considered the founder of the Vaiçeshika system; but this name, which signifies etymologically "atom-eater," appears to have been originally a nickname suggested by the character of the system; but which ultimately supplanted the true name of the founder.

The strength of the system is contained in its enunciation of the categories, under which, as Kaṇâda thought, everything that existed might be subsumed: substance, quality, motion (or action), generality, particularity, and inherence. These notions are very sharply defined and broken up into subdivisions. Of especial interest to us is the category of inherence or inseparability (*samavâya*). This relation, which is rigorously distinguished from accidental, soluble connexion (*saṃyoga*), exists between the thing and its properties, between the whole and its parts, between motion and the object in motion, between species and genus.

Later adherents of the Vaiçeshika system added to the six categories a seventh, which has exercised a momentous influence on the development of logical inquiries: non-existence (*abhâva*). With Indian subtlety this category also is divided into subspecies, namely,

into prior and posterior, mutual and absolute non-existence. Putting it positively, we should say, instead of "prior non-existence," "future existence," instead of "posterior non-existence," "past existence." "Mutual" or "reciprocal non-existence" is that relation which obtains between two non-identical things, (for example, the fact that a jug is not a cloth and *vice versa*); "absolute non-existence" is illustrated by the example of the impossibility of fire in water.

Now Kaṇâda by no means limited himself to the enunciation and specialisation of the categories. He takes pains, in his discussion of them, to solve the most various problems of existence and of thought, and thus to reach a comprehensive philosophical view of the world. The category substance, under which notion, according to him, earth, water, light, air, ether, time, space, soul, and the organ of thought fall, affords him the occasion of developing his theory of the origin of the world from atoms; the category quality, in which are embraced besides the properties of matter also the mental properties: cognition, joy, pain, desire, aversion, energy, merit, guilt, and disposition, leads him to the development of his psychology and to the exposition of his theory of the sources of knowledge.

The psychological side of this system is very remarkable and exhibits some analogies with the corresponding views of the Sâṃkhya philosophy. The soul, according to Kaṇâda, is beginningless, eternal, and all-pervading, that is, limited neither by time nor space. If, now, the soul could come into immediate connexion with the objects of knowledge, all objects would reach consciousness simultaneously. That this is not the case, Kaṇâda explains by the assumption of the organ of thought or inner sense (*manas*), with which the soul stands in the most intimate connexion. The soul knows by means of this *manas* alone, and it perceives through it not only the external things, but also its own qualities. The *manas*, as contradistinguished from the soul, is an *atom*, and as such only competent to comprehend one object in each given instant.

The last of the six Brahmanic systems, the Nyâya philosophy of Gotama, is a development and complement of the doctrines of Kaṇâda. Its special significance rests in its extraordinarily exhaus-

tive and acute exposition of formal logic, which has remained untouched in India down to the present day, and serves as the basis of all philosophical studies. The doctrine of the means of knowledge (perception, inference, analogy, and trustworthy evidence), of syllogisms, fallacies, and the like, is treated with the greatest fulness. The importance which is attributed to logic in the Nyâya system appears from the very first Sûtra of Gotama's text book in which sixteen logical notions are enumerated with the remark that the attainment of the highest salvation depends upon a correct knowledge of their nature. The psychology of the Nyâya agrees fully with that of the Vaiçeshika system. The metaphysical foundations, too, are the same here as in that system; in both, the world is conceived as an agglomeration of eternal, unalterable, and causeless atoms. The fundamental text-books of the two schools, the Vaiçeshika and Nyâya Sûtras, originally did not accept the existence of God; it was not till a subsequent period that the two systems changed to theism, although neither ever went so far as to assume a creator of matter. Their theology is first developed in Udayanâchârya's Kusumâñjali (towards 1300 after Christ), as also in the works which treat jointly of the Nyâya and Vaiçeshika doctrines. According to them, God is a special soul, like all other individual and similarly eternal souls, only with the difference that to him those qualities are wanting that condition the transmigration of the other souls, or that are conditioned by that transmigration (merit, guilt, aversion, joy, pain), and that he alone possesses the special attributes of omnipotence and omniscience, by which he is made competent to be the guide and regulator of the universe.

In the first centuries after Christ an *eclectic* movement, which was chiefly occupied with the combination of the Sâṃkhya, Yoga, and Vedânta theories, was started in India. The oldest literary production of this movement is the Çvetâçvatara Upanishad, composed by a Çivite, the supreme being in this Upanishad being invested with the name of Çiva. More celebrated than this Upanishad is the Bhagavadgîtâ, admired equally in India and in the Occident for its loftiness of thought and expression—an episode of the Mahâbhârata. In the Bhagavadgîtâ, the supreme being appears incarnated in the

person of Kṛishṇa, who stands at the side of the famous bowman, Arjuna, as his charioteer, expounding to this personage shortly before the beginning of a battle his doctrines. Nowhere in the philosophical and religious literature of India are the behests of duty so beautifully and strongly emphasised as here. Ever and anon does Kṛishṇa revert to the doctrine, that for every man, no matter to what caste he may belong, the zealous performance of his duty and the discharge of his obligations is his most important work.

The six systems Mîmâṃsâ, Vedânta, Sâṃkhya, Yoga, Vaiçeshika, and Nyâya, are accepted as orthodox (*âstika*) by the Brahmans; but the reader will notice, that in India this term has a different significance from what it has with us. In that country, not only has *the most absolute freedom of thought* always prevailed, but also philosophical speculation, even in its boldest forms, has placed itself in accord with the popular religion to an extent never again realised on earth between these two hostile powers. One concession only the Brahman caste demanded; the recognition of its class-prerogatives and of the infallibility of the Veda. Whoever agreed to this passed as orthodox, and by having done so assured for his teachings much greater success than if he had openly proclaimed himself a heretic (*nâstika*) by a refusal of such recognition. The concession demanded by the Brahmans, so far as it referred to Scripture, needed only be a nominal one; it compelled neither full agreement with the doctrines of the Veda, nor the confession of any belief in the existence of God.

By the side of the Brahmanic and non-Brahmanic systems mentioned in this survey, we find also in India that view of the world which is "as old as philosophy itself, but not older": * materialism. The Sanskrit word for "materialism" is *lokâyata* ("directed to the world of sense"), and the materialists are called *lokâyatika* or *laukâyatika*, but are usually named, after the founder of their theory, Châr vâkas. Several vestiges show, that even in pre Buddhistic India, proclaimers of purely materialistic doctrines appeared; and there is no doubt that those doctrines had ever afterwards, as they

* The first words of Lange's *History of Materialism*.

have to-day, numerous secret followers. Although one source (Bhâskarâchârya on the Brahmasûtra III. 3. 53) attests the *quondam* existence of a text-book of materialism, the Sûtras of Bṛihaspati (the mythical founder), yet in all India materialism found no other literary expression. We are referred, therefore, for an understanding of that philosophy, principally to the polemics which were directed against it in the text-books of the other philosophical schools, and to the first chapter of the Sarva-darçana-saṃgraha, a compendium of all philosophical systems, compiled in the fourteenth century by the well-known Vedântic teacher Mâdhavâchârya (translated into English by Cowell and Gough, London, 1882), in which the system is expounded. Mâdhavâchârya begins his exposition with an expression of regret that the majority of mankind espouse the materialism represented by Chârvâka.

Another Vedântic teacher, Sadânanda, speaks in his Vedântasâra, §§ 148–151, of four materialistic schools, which are distinguished from one another by their conception of the soul; according to the first, the soul is identical with the gross body, according to the second, with the senses, according to the third, with the breath, and according to the fourth, with the organ of thought or the internal sense (*manas*). No difference in point of principle exists between these four views; for the senses, the breath, and the internal organ are really only attributes or parts of the body. Different phases of Indian materialism are, accordingly, not to be thought of.

The Chârvâkas admit perception only as a means of knowledge, and reject inference. As the sole reality they consider the four elements; that is, matter. When through the combination of the elements, the body is formed, then by their doctrine the soul also is created exactly as is the power of intoxication from the mixture of certain ingredients. With the annihilation of the body, the soul also is annihilated. The soul, accordingly, is nothing but the body with the attribute of intelligence, since soul different from the body cannot be established by sense-perception. Naturally, all other supra-sensual things also are denied, and in part treated with irony. Hell is earthly pain produced by earthly causes. The highest being is the king of the land, whose existence is proved by the perception

of the whole world; salvation is the dissolution of the body. The after effects of merit and of guilt, which by the belief of all other schools determine the fate of every individual in its minutest details, do not exist for the Chârvâka, because this idea is reached only by inference. To the animadversion of an orthodox philosopher that the varied phenomena of this world have no cause for him who denies this all-powerful factor, the Chârvâka retorts, that the true nature of things is the cause from which the phenomena proceed.

The practical side of this system is eudæmonism of the crudest sort; for sensuous delight is set up as the only good worth striving for. The objection that sensuous pleasures cannot be the highest goal of man because a certain measure of pain is always mingled with them, is repudiated with the remark that it is the business of our intelligence to enjoy pleasures in the purest form possible, and to withdraw ourselves as much as possible from the pain inseparably connected with them. The man who wishes fish takes their scales and bones into the bargain, and he who wishes rice takes its stalks. It is absurd, therefore, for fear of pain, to give up pleasure, which we instinctively feel appeals to our nature.

The Vedas are stigmatised as the gossip of knaves, infected with the three faults of falsehood, self-contradiction, and useless tautology, and the advocates of Vedic science are denounced as cheats whose doctrines annul one another. For the Chârvâkas, the Brahmanic ritual is a swindle, and the costly and laborious sacrifices serve only the purpose of procuring for the rogues who perform them a subsistence. "If an animal sacrificed gets into heaven, why does not the sacrificer rather slay his own father?" No wonder that for the orthodox Indian the doctrine of the Chârvâkas is the worst of all heresies. The text-books of the orthodox schools seek, as was said above, to refute this dangerous materialism. As an example, we may cite the refutation of the doctrine that there is no means of knowledge except perception, given in the Sâṃkhya-tattva-kaumudî, § 5, where we read: "When the materialist affirms that 'inference is "not a means of knowledge,' how is it that he can know that a man "is ignorant, or in doubt, or in error? For truly, ignorance, doubt, "and error cannot possibly be discovered in other men by sense-

"perception. Accordingly, even by the materialist, ignorance, etc., "in other men must be inferred from conduct and from speech, and, "therefore, inference recognised as a means of knowledge even "against the materialist's will."

Besides the systems here briefly reviewed, the above-mentioned Sarva-darçana-saṃgraha enumerates six more schools, which on account of their subordinate importance and their not purely philosophical character may be passed over in this survey. There is question first of a Vishṇuitic sect founded by Ânandatîrtha (or Pûrṇaprajña), and secondly of four Çivite sects, the names of whose systems are Nakulîça-Pâçupata, Çaiva, Pratyabhijñâ, and Raseçvara. The doctrines of these five sects are strongly impregnated with Vedantic and Sâṃkhya tenets. The sixth system is that of Pâṇini, that is grammatical science, which is ranked in Mâdhava's Compendium among the philosophies, because the Indian grammarians accepted the dogma of the eternity of sound taught in the Mîmâṃsâ, and because they developed in a philosophical fashion a theory of the Yoga system, namely the theory of the Sphoṭa, or the indivisible, unitary factor latent in every word as the vehicle of its significance.

If we pass in review the plenitude of the attempts made in India to explain the enigmas of the world and of our existence, the Sâṃkhya philosophy claims our first and chief attention, because it alone attempts to solve its problems solely with the means of reason. The genuinely philosophical spirit in which its method is manipulated of rising from the known factors of experience to the unknown by the path of logical demonstration, thus to reach a knowledge of the final cause, is acknowledged with admiration by all inquirers who have seriously occupied themselves with this system. In Kapila's doctrine, for the first time in the history of the world, the complete independence and freedom of the human mind, its full confidence in its own powers were exhibited. Although John Davies (Sānkhya Kārikā, p. V) slightly exaggerates matters when he says "The system of Kapila . . . . contains nearly all that India has produced in the department of pure philosophy," yet Kapila's system may claim, more than any other product of the fertile Indian mind, the interest of

those contemporaries whose view of the world is founded on the results of modern physical science.

As for those who feel they are justified from a monistic point of view in looking down slightingly upon a dualistic conception of the world, the words of E. Rŏer in the Introduction of the Bhâshâpariccheda, p. XVI, may be quoted: "Though a higher development of philosophy may destroy the distinctions between "soul and matter, that is, may recognise matter, or what is perceived as matter, as the same with the soul (as for instance, Leibniz did), it is nevertheless certain, that no true knowledge of the "soul is possible, without first drawing a most decided line of demarcation between the phenomena of matter and of the soul." This sharp line of demarcation between the two domains was first drawn by Kapila. The knowledge of the difference between body and soul is one condition, as it is also an indispensable condition, of arriving at a true monism. Every view of the world which confounds this difference can supply at best a one-sided henism, be it a spiritualism ŏr an equally one-sided materialism.

R. GARBE.

KÖNIGSBERG, PRUSSIA.

LITERARY CORRESPONDENCE.

FRANCE.

M. Fr. Paulhan offers us in his new work, *Les caractères*, a study of concrete psychology, which he connects with the general system of psychology already known to your readers. Two classifications of characters have been recently proposed: one by M. Bernard Pérez,* in a work of which I have already spoken in this place; the other by M. Ribot in his course at the Collège de France (see the article in the *Revue philosophique* for November, 1892). M. Pérez establishes his types by the nature of the *movements* which in his judgment are the revelations of the character. Rapidity, slowness, and energy of movements give him *les vifs*, *les lents*, *les ardents*, or, as we might translate them, the *quick*, the *sluggish*, and the *ardent*, and by combination the *quick-ardent*, the *slow-ardent*, and the *balanced*. This, if I may be allowed the expression, is a classification of the ground-floor. That of M. Ribot is one of two or three stories. This author finds the dominant traits of character in *feeling* and *action*; these furnish him with three classes or generic types, the *sensitive* or emotional, the *active* or energetic, and the *apathetic*. Each one of these genera is in turn subdivided into specific types, based (I omit all details) on the variable proportions in which the intellect, taken for character of the second stage, is mingled with sensibility and activity. The last types, called *composite*

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* *Le caractère*. The fifth revised edition of M. Pérez's *Les trois premières années de l'enfant*, and the third edition of his *L'enfant de trois à sept ans*, have just been published by Alcan. These works have become classical.

and *partial*, represent, after a fashion, the crossings, and answer to the species. I may add that by relegation to a class of *armorphous*, or *unstable*, M. Ribot rejects in a lump a multitude of individuals possessed of no true character or personality.

With M. Paulhan the case is otherwise. The different categories of psychic types established by him are presented to us as the incarnations of abstract laws of general psychology, and it is here that we must seek "the examples of that grand universal law that brings to pass all that develops from plurality to unity, from incoherence to systematisation, and from chance to finality." If, then, character signifies, in the end, the system of association of the elements of personality, a classification of characters ought to reproduce the modes of the possible systems, the psychic compounds which are actually realised, and to follow up the varieties of combination, by proceeding from systems relatively broad to systems more restricted. The object of all classing is ultimately to reach the individual by gradually detaching it from less and less general groups. But what principle is to guide us in the hierarchic composition of our groups of character?

M. Paulhan indicates two classes of primary qualities capable of forming by their predominance psychological types. And these are the classes of qualities comprising (1) *forms* of mental activity, and (2) the concrete elements which *guide* that activity. We get, thus, first, (*A*), the types produced by the predominance of a particular form of mental activity, and here M. Paulhan considers the types proceeding (*a*) from different forms of psychological association, (*b*) from the different qualities of the tendencies and the mind; and, secondly, (*B*), the types formed by the predominance or the absence of a tendency, and here the author distinguishes the types determined, (*a*) by the vital tendencies, (*b*) by the social tendencies, and (*c*) by the supra-social tendencies. We obtain, thus, two degrees of determination. Nothing remains to be done except to connect the individual with one of the types of the first class, and to seek the modifications which he suffers in passing into the second. Two questions now arise. What are these directive principles worth, and what is the practical value of this classification?

The forms of general activity in which M. Paulhan finds his initial principle, call to mind the differential character which M. Pérez has given in citing movements as the indexes of character and which M. Ribot sees in suffering and in action. As to the second principle of M. Paulhan, we do not have its equivalent in the system of M. Pérez, but in that of M. Ribot we meet with one at least of the invoked *tendencies*, I mean the *intellect*, and it is the combination of the "form" and of the "tendency" which gives us in the two classifications the determinations of the second degree.

Here, however, the difference is clearly seen. M. Ribot has simply accepted dominant and averred traits of character—sensibility, activity, and intelligence. M. Paulhan starts from a personal theory; he is guided by the idea of "abstract systematisations," realised in the individual. His point of view is of incontestable value, but it runs the risk of losing altogether the real unity of the ego in seeking to seize its diversity. Does not his classification, by its comminution of types, lose part of its practical value? I fear it does, and I observe here in fact numerous qualifications put under headings which do not express a mode of being or acting at all precise and limited.

But will it not necessarily complicate our classification to define unities so highly complex as social individuals? I do not think so, and, although it may appear at first sight contradictory, I think a classification should offer outlines of greater extent and simplicity according as its ultimate distinctions are more difficult of appreciation. The principal merit of M. Paulhan, in my opinion, therefore, is that of having marked out a plan of study. Yet these very reservations throw upon me the duty of a just laudation of the high qualities of his work, which is highly interesting and filled with fine and profound *aperçus*. In reading the works of an author like M. Paulhan one is always fully recompensed.

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M. Le Dr. Durand (De Gros), of whom I have recently spoken in this place, has just published a new work, *Le merveilleux scientifique*, where he takes up anew the question of hypnotism. We meet

in these pages with the vigor, sometimes rude, of the combatant of the first hour, with a carefulness of method and of generalisation which is too much lacking in our day. Perhaps he will be reproached with having slightly sacrificed experience to speculation. He expounds with lucidity in the historical part of his book the different methods of hypnotism and suggestion practised by Mesmer, Braid, Faria, and Grimes. Leaving with those to whom it is due the honor of the discoveries, he justly claims for himself the priority of the theoretical views since largely exploited by recent writers. What are they? I shall endeavor to answer the question in a few words.

The theory of M. Durand implies two fundamental hypotheses. The one is, that the passes of hypnotism, by the inertia of thought which they bring on, determine an afflux of "nervous force" to the brain, in consequence of which the subject is rendered fit to receive the action of suggestion. Now the condition of that afflux is beyond doubt to be sought in a different distribution of the supply of blood, and that condition at least is not absolutely unverifiable. In any case, the phrase "nervous force" does not, in my judgment, necessarily imply an ultra-physical meaning; and, whether in gravitation, affinity, electricity, or what not, the notion of force is always reduced to a notion of equilibrium between material particles. If, finally, as M. Durand is inclined to think, there exists some state of matter which we do not know of, the existence, even if verified, of that new state, is still insufficient to justify at the very outset the miracles of occultism and of telepathy. But I shall not enter into this debate, and shall not object in advance to the possible discoveries of to-morrow, since we are not at the end of our science.

The other hypothesis consists in regarding the nervous centres and ganglia as real souls or physiological individualities possessing sensibility, memory, consciousness, will. There has been a general disinclination to accept the "spinal" and "ganglionary" souls of M. Durand; but several authors, such as Mr. Myers and M. Pierre Janet, speak to us of a "subliminal consciousness" and of a "subconsciousness," which is almost the same thing. And on the other hand, authors who, like M. Beaunis, reduce the rôle of the "sub-

egos" to mechanisms do not, according to M. Durand, extricate themselves from the contradiction which consists in qualifying as *unconscious*, acts which are *intelligent*. They escape here, he says, by maintaining that automatic, mechanical acts arrive at the consciousness of special centres which preside over them, but never reach the synthetic consciousness of the principal ego. Further, it will be necessary to come to some understanding about the relations of these souls with the higher ego, about their physiological character, their anatomical positions—no slight matters! But the hypothesis is not arbitrary; it remains a positive hypothesis, and may be justified from the general point of view of evolution.

It would take up too much space to show how the author utilises these two principles. But I must state that he was one of the first to show a distinct intelligence of the problems which the stupendous rôle of automatism creates in our psychic life, under the different names of habitude, technical memory, and revived impression, dreams, unconscious cerebration, etc. We have, in fine, in his book a psychology and a philosophy. We will read with interest some pages of his last chapter on the evolution of the ideas of God and of the soul. He has reached a monistic theory alike opposed to materialistic monism and spiritualistic dualism. He does not assume that matter is of a different essence from spirit; it is naught but its objective manifestation. The prime mover of the universe is conscious force.

M. Durand is a pronounced adversary of positivism. Comte made the grave mistake, we must admit, of confounding totally different intellectual problems under the one ill-defined head of metaphysics, and the literal application of his method will lead to the restricting of science to the work of the ant. Still, attenuating circumstances can be pleaded for him, as for the school of Magendie. No synthesis is possible without preliminary analysis, and positivism has sought to bring us back to facts by a reaction against philosophical fantasies, and to shut off the easy flights of the mind through the fissures of mysticism. It is necessary to put men back into their proper times to judge of them justly. The fault of rigid disciples is that they forget that the master they restrict themselves

to paraphrasing would have taught quite different lessons if he had come into the world a half century later.

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M. TH. FLOURNOY, of Geneva, has just supplied us with an excellent contribution—the result of a joint inquiry with M. J. Claparède—to the study of the *Phénomènes de synopsie* (*colored audition*). The faculty, now apparently common, of connecting visual images (sometimes hallucinatory) with auditory perceptions, largely occupies at present the attention of psychologists. Galton, Binet, and some others, have furnished good observations. In Germany Professor Gruber has applied himself to this new study, to which he attaches an excessive importance, and from which he expects results which in my judgment will never be forthcoming. M. Flournoy is more reserved than Professor Gruber. As the explanatory principles of synæsthesia he invokes in default of better ones, affective association, habitual association, and privileged association. These principles certainly suffice to explain a number of facts. But I think that the majority of cases, at least, always point to an anomaly, a psychic trouble, unimpaired though the subject may be in other respects. In short, I recommend the book of M. Flournoy to the curious. It is written with spirit, sagacity, and good judgment.

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I have still to point out a book of M. CH. FÉRÉ, *La famille névropathique*, a teratological theory of morbid heredity and disposition; the hereditary elements, says M. Féré, are disorders of nutrition in the embryonic period, troubles which bring in their train different effects according to the epoch at which they are produced. Finally, there have appeared translations from the German of Oldenberg's *Buddha*, and of Max Nordau's beautiful work *Degeneration*. This last work is of great value, and I should have gladly reproduced the praises which I bestowed upon it in the *Revue philosophique* if *The Monist* had not already announced it to its readers under its German title *Entartung*. It is very desirable for the good of French literature that foreigners should not add to the success of certain of our writers, with whose merits the press is surcharged.

The help which the so-called experimental or psychological novel renders to the true understanding of human nature is very feeble when we look over the real and serious contributions of works such as those I have just mentioned.*

LUCIEN ARRÉAT.

PARIS.

THE PARIS INTERNATIONAL BOOK-EXHIBITION.

Every summer, after the close of the *salon*, an exhibition of some sort is opened in the Palais de l'Industrie and continued till winter sets in. These exhibitions are generally of rather a trivial nature. The chief attraction for most of the visitors, especially during the summer months, is the band which plays twice a day in the large covered garden given up to the sculpture during the *salon*. But this year's exhibition promises to be a notable exception to the rule, for it is to be devoted to a large and complete display of everything connected with books.

The approaching "Exposition Internationale du Livre et des Industries du Papier," which begins this July and continues till December, will be held under the patronage of the Ministers of Industry, Public Instruction, Fine Arts, and Public Works, and under the immediate direction of the Paris Publisners' Club (Cercle de la Librairie). The committee of patrons includes the names of the leading French publishers, of several members of the Academy, of well-known journalists and men-of-letters, of the directors of three of the great public libraries and of members of both Houses of Parliament. The Director-General is M. Georges Sénéchal, an ex-officer of the French navy, who has had wide experience in exhibitions.

The exhibits will be divided into fourteen groups, subdivided into thirty-seven classes, and will embrace the whole circle of knowledge, industry, and science which enters into the production of books and its kindred branches, newspapers, periodicals, etc. Thus, Group I will have to do with everything out of which paper can be

*All published by F. Alcan.

made and, at the same time, will offer specimens of the cheapest and most costly papers,—hand-made, China, Japan, vellum and parchments. Group II is confined to the materials used in printing, Group III to the machinery, and Group IV to the products, such as playing-cards, postage-stamps, *exlibris*, and the finest kinds of lithography, etc. Photography forms Group V.

But the centre of interest of the exhibition will be found in Group VI devoted especially to books, where will be seen examples of every sort of volume issued from the French and many foreign presses. A fine series of maps will be hung about the walls and the whole science of bookmaking will be displayed and exemplified. The fact that M. Gruel, President of the Bookbinding Trade, whose contributions to the French book section at Chicago will be remembered by many of *The Monist's* readers, has lent his name to the enterprise, tells what may be expected in the department of bibliopegy. All fine art publications will be brought together under Group IX, while Group X—a retrospective exhibition—will contain many rare curiosities loaned by public and private collections, such as papyri, manuscript Bibles, autographs, ancient *exlibris*, etc., and specimens of old processes employed in the manufacturing of books.

Group XI will embrace the exhibits of societies, benevolent organisations and co-operative printing offices which are in any way connected with the book business. Everything pertaining to bookcases and libraries, even to their heating and lighting, will be grouped by itself—Group XII—while Groups XIII and XIV will be of a miscellaneous nature and will include writing-machines, pens, pencils, new inventions, etc.

There will be a double jury—the "section jury" and the "superior jury." Half of the members of the section jury will be chosen by the exhibitors themselves and half by the Commissioner-General. The superior jury will be made up of the officers of the section juries. These juries will award diplomas of honor and medals of gold, vermilion, silver, and bronze, honorable mentions and "diplomas of collaboration," the last to be given to the best workmen of the houses which exhibit.

The special commissioner for the American and English sec-

tions is M. Gaston Rebours, the representative in France of *Scribner's Magazine*. He has formed an American and an English committee in Paris. At the head of the latter stands the British Ambassador, while the United States Ambassador has accepted the presidency of the American committee, one of whose members is Mr. Henry Vignaud, First Secretary of the United States Embassy, and an ardent bibliophile as well as a laborious diplomat.

THEODORE STANTON.

PARIS.

JAPAN AND CHINA.

The Japanese monthly *Richgozasshi*, of January, 1893, contains an article by Professor Inowye in which he compares Sosi's philosophy with Christianity, Spencerianism, Confucianism, and German pessimism. As Professor Inowye's article is inaccessible to those not familiar with the Japanese language, we here present a résumé of Sosi's philosophy, which is too little known among Western scholars.*

Sosi was born in the country of So, China, 400 years B.C. He was known as an eloquent orator, energetic writer, and learned philosopher. He left his noble work entitled with his own name, and it is read by all scholars in the literary line and admired by modern philosophers. By virtue of his doctrine, which partly coincides with Buddha's "Nirvâna" and partly with Schopenhauer's pessimism, he duly belongs to the modern idealistic school.

Sosi was no less a great thinker than Plato or Socrates, who lived in the same age. If his doctrine could be carefully tested by

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*We present here a table of the names referred to in this article, in Japanese and Chinese, as the spoken sounds of the same literal characters differ in the two languages.

JAPANESE	CHINESE
Sôsi.	Chwang-Tsz
Sô	Sung
So	Sú
I, (Eh)	Wéi
Bokusui	P'oh-Shwui
Gi	Wéi
Kautaishi or Kantaishi	Kwan-T'ui-T'sz'
Densiho	T'ien-Tsz'Fang
Sika	Tsz'-Kwá
Shusi	Chú-Tsz'
Chôsôkôsi	Cháng-Sang-Kung-Tsz'
Kan-insi	Kwan Yin Tsz'
Rôsi	Lao-Tsz' or Lau-Tsze
Tôkakusi	Tau-Kwo-Tsz'
Keisi	K'ing-Tsz'
Ressi	Lieh-Tsz'

the Western philosophers, assuredly it would command their admiration and very likely give some light to philosophical controversies: it is for this purpose that I bring this doctrine before you.

Sosi was born of a very poor family and lived under a constant pressure of poverty, by which, however, he was never depressed. Numerous opportunities for high positions were uncared for; he had no regard for money. We are told that King I, of So, sent a magnificent present to Sosi and offered him the office of prime minister. Sosi answered the king's messenger thus: "The thousand pieces of gold is a good income; the position of prime minister is high and honorable; but dost thou not know the fate of the pig that is fattened for the feast? It is carefully fed, daintily dressed, and finally guided into the temple where it is to be sacrificed. At this time it might desire to be a common pig, but how can it escape? Go thou away promptly; I would rather stay in a lowly home and enjoy its poverty, than to be held in bondage by the king."

The king was still anxious to secure him and sent two high officers, and repeated his demand by saying: "Please come and take the government in your hands." Sosi, who was fishing in the river Bokusui, answered without giving them any sign of respect: "I have heard there was a strange turtle which lived three thousand years ago in thy country, the skeleton of which the king carefully wraps up and keeps in his palace. Would this turtle rather die to be thus glorified by the king, or would it live to crawl in a muddy pond?" Then the two officers said: "We should think that the turtle would rather like to live in the muddy pond." Sosi replied: "Go thou away; I also would rather live in the muddy pond."

Sosi, wearing old shoes and soiled clothing, met with the king of Gi, who, having sympathy for the philosopher in his poverty, said to him: "How depressed thou art!" Sosi answered: "I am poor, but not depressed. If one has moral principles, yet cannot practise them, then he would be depressed; those who have tattered clothes and old shoes may be poor, but not depressed."

From the foregoing stories we learn for what he cared and for what he did not. His indifference to fortune is due to his doctrine.

How was he educated? and whose doctrine did he fol-

low? are important questions; there are two traditions about his early education. According to Kantaisi, Sosi was taught by Densiho, whose name is given in Sosi's book. Densiho was taught by Sika, who was one of the principal disciples of Confucius, and in this respect Sosi may be called a follower of Confucius. But Shusi said Sosi was taught by Chosokosi, who was a pupil of Kan-insi, who was a disciple of Rosi;* therefore Sosi must be a follower of Rosi, the great rival philosopher of Confucius. By examining Sosi's doctrine we may judge that he belonged to Rosi's school rather than to Confucius's, yet it seems that he first studied the latter, then the former, and finally built up his own system, which in its ethical application coincides with that of Rosi.

Sosi's principle is based upon Rosi's, but he discusses the subject more freely than his predecessor. However, his discussion is rather conversational than argumentative; consequently, his noble phrases are disjointly placed, and the treatise, as a whole, sinks into confusion.

Sosi recognises two kinds of existence: the one is distinguishable, and the other undistinguishable; the one is relative and finite, and the other is absolute and infinite; the one is the world of dependence and mutual maintenance, the other is independent and self-existing; finally, the one is a false, temporal, and changing world, the other is a true, eternal, and fixed world.

All these notions are derived from the first couple of antitheses —distinguishable and undistinguishable. The same conclusion may be arrived at from a psychological point of view. Let me briefly discuss it.

When the state of things is distinguishable its various aspects reflect upon the mind and arouse the waves of thought, producing emotion, passion, and temptation. But where there is no distinction in the state of things, and all are equal like the perfect equilibrium of scales, there are no vibrations arising in our consciousness. The one is a state of perfect equilibrium, therefore its condition is

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* Rosi is the Japanese spoken sound of Lâo-tsze. See table on page 607, footnote.

fixed and peaceful; the other is out of balance, therefore its condition is changeable and struggling. Hence Sosi thought this real world not a very happy world. He said the distinguishable world is a temporary world of short lodging, and the undistinguishable world is the one which we should seek to attain.

Sosi derived this idea of two sorts of worlds from Rosi, who said in the first chapter of his book: "Non-name is the beginning of the world, and name is mother of the universe."

Here, by "non-name," Rosi means the undistinguishable world, and by "name" the distinguishable. Sosi divides Rosi's non name into two, in order to make a clear separation of the distinguishable from the undistinguishable, and said in the chapter of "Heaven and Earth": "There was in the beginning of the world nothing-nothing, then non-name, and then name." Here by "nothing-nothing" he does not mean the world was originated out of nothing, but that there was such a thing that could never have properly been termed anything else than "nothing-nothing," which, in his view, is still existing and forming the true world.* Here a question will naturally arise. If this real world of transiency was made from "nothing-nothing," why does it differ from the true world of "nothing-nothing"? This may be answered by saying, "nothing-nothing" is creative while the real world is created; being modified, it retains no longer the first quality. "Nothing-nothing" may contain Rosi's "non-name" and Ressi's "invisible," and it well coincides with Spencer's "Unknowable."

According to Spencer, "the Unknowable" is beyond reach of

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*The ideas "nothing" and "emptiness," as is well known, play an important part in Lâo-tsze's philosophy. The Chinese conception of nothing, however, is different from that which is common among the Western nations. Nothing, in Chinese philosophy, is the absence of distinguishing features and the presence of all that which permeates with equal reality all existence. It is comparable to Hegel's Absolute, who also puzzled the world with his famous dictum that absolute nothing and absolute being are identical. Now Sosi's term "nothing-nothing" must not be construed to mean a negation of nothing, so as to denote something that is "not nothing," but, according to the Chinese idiom, it conveys the idea of a higher kind of nothing; it is, as it were, and to use the mathematician's slang, 0^2, viz., nothing to the second power, and we might translate it by "absolute nothing."—ED.

human knowledge, yet underlies everything. So it is with "nothing-nothing." It is beyond human reach yet we are originated out of it; and we cannot be independent of it but it includes us all; as it is infinite and we finite, we are simply its parts. This idea becomes clear when he claims his truth of "nothing-nothing" to be omnipresent. Tokakusi asked Sosi, "Where is the Truth?" Sosi said, "The Truth is in ants." Tokakusi, being surprised with the answer, repeated his question. Sosi said, "It is in wheat, in brick and in wall." Thus he evidently claims the truth of "nothing-nothing" to be in either organic or inorganic matter, and in every space and time. The universe, whether known or not, has a knowable character. We are like a frog in the bottom of a well, ignorant about the universe. But when we come up to the top we shall know more. Hence Sosi divided his distinguishable world or knowable universe into two, by calling them "name" and "non-name" according to whether they are conceived by human thought or not. Unknowable or undistinguishable is not that which is not known, but that which cannot be known. We may be with it when we reach that highest stage. To be with it is not to know it: to know it is to describe it relatively. But how can we speak relatively when there is nothing to compare?

Thus Sosi's classification was a great success; it made the distinction between knowable and unknowable very clear—the task in which Spencer failed utterly.

Sosi applied this same classification to humanity and said, "I have reached as high as "nothing" but not "nothing-nothing" yet. Thus the essence of Sosi's doctrine is "nothing-nothing" and he regards it as the highest stage which we must strive to attain.

"How can we attain this stage?" is the most important question on which his doctrine is based. Sosi answers this question with four words, *Kio mu ten tan*, which may be translated: "Sweep off all the impurity from thy heart, and store only the truth, which is 'nothing-nothing.' Therefore, in short, keep thy heart empty." To do this is to cast aside all worldly desire and to animate ourselves with the divine spirit. Is this not near the Christian teaching? Yet a spy of the enemy lies in the pleasing spot. Spirit is

immortal, yet life is mortal. Spiritual life must be distinguished from physical life. The first is not a continuation of the second. Spirit simply rests in a living body and it does not give life to dead matter. This distinction is not clear in Christianity, yet it is very clear in Sosi's doctrine. He said, "Life is combination or arrangement of elements; when the elements assemble, there is life; and when they scatter, there is death. Consequently the life is that which we borrow and is therefore the dust." In the chapter of "Absolute Happiness" of his book, he gives us an interesting story, relating to his own conduct, which may astonish my reader. Sosi lost his wife. His friend Keisi came to mourn her death, but seeing Sosi lying down and singing, he was quite surprised and blamed him: "Thy wife was a faithful companion; she nourished thy children, became aged and now is dead; but thou art not only indifferent to her death but lie here and sing. What is the matter? Is this conduct not abominable?" Sosi answered, "No, since I lost my wife why should I give utterance to my sorrow? Think of her origin; she had no life, no shape, no spirit, before she was born. Some things which were floating in infinite space were assembled, modified and formed elements: the elements modified and formed shape, and the shape modified and formed the living being of humanity. Now her body has taken a reverse order, modified itself and sunk into death. This is quite analogous with the passing of spring and autumn, winter and summer. O! my wife has gone into this 'Great Room,' the universe. If I cry and regret, I show my ignorance of 'Decree'; therefore, I do not cry." If he had been Schopenhauer he would very likely have requested congratulations upon her death, for, according to his pessimism, the birth of any one is to be regretted, because he must fall under the burden of bitterness of this melancholy world. Sosi did not go to such an extreme as Schopenhauer, but his dislike of the world was clear when he said: "The life-time in the world is not better than the time before his birth." Then he continues, "death is better than birth."

This idea may be illustrated by an interesting story told of him.

"Sosi went to So and saw a skull lying on the ground. He struck it and said: "Hast thou been covetous of life, but finally art

overcome by death? Hast thou been killed when thy country wast destroyed? Having committed some crime, hast thou killed thyself, fearing punishment and disgrace to thy family? Hast thou died from hunger or cold? Hast thou been wearied by thy great age?" Speaking thus, Sosi went to sleep, taking the skull as a pillow. At midnight Sosi dreamed of the skull who said to him: "All that thou hast suggested are distresses of mankind, but when one dies one has no trouble at all. Wouldst thou like to know what death is?" Sosi answered "Yes." The skull said: "If a man is dead he has no king, no subject, no change of climate, but freely floats in heaven; no king can enjoy such profound happiness." Sosi not without distrust asked the skull: "Wouldst thou like to be covered up with flesh and skin and sent back to thy home?" The skull clouded his brow, and said: "Why should I desire to leave this happiness and return to the world and resume human distress?"

Such being Sosi's doctrine, its essential point is to leave or forget this toilsome world and embody ourselves with "nothing-nothing." But such an effort and passive nature can never be expected of man. For this reason Sosi's doctrine could neither progress nor be practised. And this is the main difference between Sosi's doctrine and Confucianism.

KEIJIRO NAKAMURA.

JAPAN.

BOOK REVIEWS.

LOGIK. By *Dr. Christoph Sigwart.* Zweiter Band. Die Methodenlehre. Zweite durchgesehene und erweiterte Auflage. Freiburg i. B. and Leipsic: J. C. B. Mohr. 1893. Pp. 761. Price, 10 marks.

LOGIK. EINE UNTERSUCHUNG DER PRINCIPIEN DER ERKENNTNISS UND DER METHODEN WISSENSCHAFTLICHER FORSCHUNG. By *Wilhelm Wundt.* Erster Band. Erkenntnisslehre. Zweite umgearbeitete Auflage. Stuttgart: Ferdinand Enke. 1893. Pp. 651. Price, 14 marks.

"If one were to inspect," says Professor Adamson, "a fair proportion of the "more extensive recent works on logic, the conclusion drawn would be probably 'the same,—that, while the matters treated show a slight similarity, no more than "would naturally result from the fact that thought is the subject analysed, the di- "versity in mode of treatment is so great that it would be impossible to select by "comparison and criticism a certain body of theorems and methods, and assign to "them the title of logic. . . . In tone, in method, in aim, in fundamental principles, "in extent of field, they diverge so widely as to appear, not so many different exposi- "tions of the same science, but so many different sciences. In short, looking to the "chaotic state of logical text-books at the present time, one would be inclined to say "that there does not exist anywhere a recognised, currently received body of specu- "lations to which the title logic can be unambiguously assigned, and that we must "therefore resign the hope of attaining by any empirical consideration of the re- "ceived doctrine a precise determination of the nature and limits of logical theory."

In its modern form as theory of knowledge and methodology, logic embraces parts of nearly every philosophical discipline. In each investigator's hands it has assumed a form which accords with the author's predilections, being predominantly metaphysical, epistemological, psychological, mathematical, or linguistic, according as the processes of thought, in the aspects in which they are treated, are deemed to be better typified or illustrated by the one or the other of these points of view. While some treatises have laid special stress upon only one of these sides of mental activity, others, in the aspiration to be a complete compendium of the science, have sought to do justice to all, so that most of the works of this latter class have become

rather epitomes of the results of the investigations of the special sciences than a study of the laws of thought and inquiry. Especially have these treatises neglected the discussion of the philosophical foundation of the laws of thought and inquiry, having restricted themselves almost exclusively to the exposition of the methods of science, as justified by results; although such a discussion is absolutely indispensable to the determination of the scope and character of logic.

Two noteworthy exceptions to this error are the works of Sigwart and Wundt, although each has accomplished its task in a different measure and in a different manner, showing differences of point of view and of scientific training. Sigwart's treatment of the fundamental philosophical question is predominantly formal and metaphysical; Wundt's predominantly psychological. This difference is also noticeable in the second volumes of their works, which treat of methodology, where the investigations of Wundt are richly embellished by illustrations from all the positive sciences, while Sigwart is very meagre in historical illustrations. Both agree in their independence of tradition.

Professor Sigwart, to take his book first, was one of the first laborers in the field of modern logic, and of all the larger treatises on the subject his is perhaps the most economically and concisely worked out. We do not meet in his work with résumés of the special sciences nor with profuse criticisms of opposed opinions, but have simply an exposition of methods in a clear and general form permeated by unity of treatment and distinguished by perspicuity. Still the work is large enough. It consists of two indexed volumes, containing respectively four hundred and eighty-five and seven hundred and seventy-eight pages, published in 1873 and 1878. The first volume of the present edition, reviewed in *The Open Court* of 1889, No. 107, appeared in 1888; the second in 1893. It was thus, we see, one of the first of that great series of works beginning with Trendelenburg, Ueberweg, and Mill whose object was to new-model logic, and to bring it into living relation with the scientific wants of the time. We shall review here Professor Sigwart's conception of the scope and purpose of logic and then present a résumé of his idea of methodology.

One of the chief and most imperative prerequisites of successful conduct in life is the possession of principles that are certain and universal. Hence the need of reflexion upon the conditions under which this object can be attained, and consequently of determining the rules by following which it can be attained. This is the problem of logic; if it were solved we should have *a true art of thought*.

The nature of thought is primarily a subject of psychology. But the foundations, here, are mooted questions. Language affords us the best foothold. In this, thought is essentially presentative activity: either involuntary, such as that which makes up the ordinary routine of life, or voluntary, willed, presentative activity, the purpose of which is the pursuit and satisfaction of the needs of life, in the widest sense of that expression. Here we are. We find ourselves surrounded by facts, circumstances, laws, with definite purposes to be realised. How are we to determine whether the thought which guides our conduct will, when executed, accomplish our

purposes? Solely by our awareness of the necessity of our thought, or in other words by its logical structure.

Necessity of thought here, is not to be interpreted as *psychological* necessity, but is to be conceived as a necessity which is rooted in the contents and object of thought itself, in the nature of the objects that are thought: this is what we mean when we speak of the objectivity of thought.

Again, in the connexion of logic with ontology, it is exactly the same attributes which express the object of thought when this serves the purpose of reaching a knowledge of existence. Here, too, the aim at which purposive thought strives must be stated as a consciousness of its necessity and universality. Ordinarily we assume the existence of an independent objective world by a kind of psychological constraint, the knowledge of which is the object of thought. But this conclusion is always found on analysis to be an act of inference resting in the necessity of our thought; outside of thought there is no means of knowing whether we have reached this object; agreement of thought with fact is therefore necessity of thought; and necessity of thought in all minds, with respect to the same object, is universal thought. If the possibility of a knowledge of the world as it is in itself be denied, if being is only one of the thoughts that we produce, the fact yet remains undisputed that we attribute objectivity to the ideas which we produce with the consciousness of necessity, and that as-soon as we posit a thing as existing we declare by implication that all other thinking beings of the same nature must produce it with the same necessity. This means that if we produce only necessary and universal thought, the knowledge of existence is implied in that thought. This conception exhausts the nature of "truth." Whether we speak of mathematical, objective, or moral truths, the common character of that which we denominate is, that it is a necessary and universal product of thought. We thus avoid the difficulties involved in the assumption of any special theory of knowledge as a foundation of logic.

Now, all thought which seeks to become conscious of its necessity and universality is accomplished in judgments expressed as statements or sentences; judgments are the goal of all practical reflexion, of all knowledge, the final form of all conviction; all else are conditions and preliminaries of judgment. But error and contention show that our practical thought often fails of its purpose, the judgments in which it is stated being in part rejected by ourselves and in part by others. Hence the necessity of a discipline which will teach us how to avoid error and controversy, and to execute our operations of thought so that the judgments which proceed therefrom shall be true, that is, necessary and certain, and that is, again, accompanied by a consciousness of their necessity, and, therefore, universal. Here, the logical and psychological consideration of thought are distinguished. Psychology seeks to exhibit to us the natural history of thought; the opposition of true and false has no place in it. But logic presupposes the purposive thinking of truth. In this aim it sets up the criteria of the thinking of truth, and on the other hand supplies instructions for so conducting thought that the truth shall be reached.

Logic is thus in one aspect a critical discipline of completed thought, and in the other aspect an art of thought. But again, as all criticism is of value only in so far as it is a means to attain an end, the highest and most important task of logic, and that which constitutes its real nature is its office as an art.

With respect to the scope of logic it is to be stated that this science assures us only of the formal correctness of the processes of thought and not of their material truth. With respect to the postulate of logic, the possibility of setting up criteria and rules of necessary and universal mental progress, rests upon the ability of distinguishing objectively necessary thought from non-necessary thought, and this ability is manifested in the immediate consciousness of the evidence which accompanies necessary thought; the experience of this consciousness and the belief in its trustworthiness is a postulate behind which we cannot go. The criterion which distinguishes necessary and universal judgment from false individual judgment is in the end our subjective feeling of necessity, our consciousness that with the given assumptions we *cannot* think differently from what we do.

These considerations determine Professor Sigwart's method of treatment. First, the nature of the function must be investigated for which the rules are to be sought; secondly, the conditions and laws of its normal operation must be determined; and finally, the rules of procedure are to be discovered by means of which from the incomplete condition of natural thought on the basis of given assumptions and means the perfect condition can be reached. The investigation is, therefore, divided into an analytical part, a normative part, and a technical part. The first two parts make up Volume One. Volume Two, of considerably greater extent, constitutes the technical part, being methodology.

The office of methodology is to supply the directions according to which from a given state of mind and knowledge by the use of the mental powers at our control, the object can be fully reached which human thought has set itself, and when we say fully we mean, by fully determined concepts and fully established judgments. Absolute certitude of notions and conscious verification of judgments are the two essential features of the ideal condition at which our thought aims. The question, how this ideal state can be reached with the means at our command is the object of the doctrine of methods.

In the second, the normative part of the work, the necessity was emphasised of searching for the simple elements of concepts and of determining the forms of their synthesis, so that we could have the conviction that the simplest elements of concepts were thought by all in the same manner, and that they were competent to determine fully every object of thought by unequivocal mental attributes. In the second place, in laying the foundations of judgments, it was found necessary to have full consciousness of those judgments which carry their justification in themselves; which necessitated the search for axioms. Hence result the following two inquiries, as determinative of the form of methodology, namely: (1) the procedure by which it is possible so to fix the collective simple elements of all the contents of

the mind that we can be sure of their agreement in all thinking persons, and can determine the forms of their synthesis so that they can be combined in a concordant manner into composite concepts by all rational beings; (2) the procedure by which it is possible to acquire a clear consciousness of the ultimate assumptions of all judgment, upon which all justification of judgments not immediately evident depends, and by which we can establish the justification of every single judgment in a universally cogent manner.

More especially, the form of methodology is dependent on the nature of the conditions of fact in which the thought stands that it proposes to regulate, and on the other hand on the contents of the purpose which our purposive thought sets itself. This purpose is in part the knowledge of the world, as accessible to perception, and in part the establishment of the ultimate aims of practical volition. The ideal knowledge of the world involves a complete picture of the world in space and time, a classification of the facts of reality, an insight into the necessity of the facts of reality in the form of absolute causal connexion. Reflexion on the aims of practical volition finds its consummation in the setting up of a highest purpose which embraces all individual acts, and in the insight that that purpose must be unconditionally willed.

It will be readily seen that the inquiries set involve a consideration of the history of science, and as the first and most essential foundation the analysis of all our notions into the simplest elements, with their resultant manifold syntheses constructed according to fixed rigid rules. How these two principles lead to the examination of the fundamental notions of mathematics, psychology, etc., is evident, as is also the manner in which they must be grouped in such a consideration.

A very interesting addition to the second edition is a discussion of the notion of effect appended to the section of that name, treating of causality, where Wundt's notions of substantial and actual causality are very clearly criticised. A feature of the second part, also, is Sigwart's *special* discussion of the methodological premises of psychology.

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Coming to Wundt, some idea of this author's conception of the scope and purpose of logic will be given, as best characterising the work. Although we should not accept to-day, says Wundt, Kant's dictum of the stability of logic, nor ascribe any real value to the artifices of the scholastic syllogistics, much less regard thought as a simple mechanism of subsumption, it is yet customary with most authors, despite this belief, to start from the old traditions. By their adherence to these old forms, however, they unwittingly hamper themselves, for the Aristotelian logic, though it is useless as an organon of truth, is still not incorrect. Wundt, therefore, in his investigation begins anew and draws his material, not from tradition, but from the living testimonies of thought in language, and from those assured and successful methods of acquiring knowledge actually used in scientific research. Only in so

far as historical elucidation is necessary is the traditional side of logic regarded in his treatment.

Logic, according to Wundt, must give account of the laws of thought which are active in the quest of truth. Logic is made thus to assume a place between psychology, the general science of mind, and the remaining theoretical sciences. Psychology teaches us how the course of thought is actually accomplished; logic determines how the course of thought must be accomplished in order to lead to correct results. Whilst the individual sciences seek to ascertain the facts of their respective provinces, logic seeks out the universal rules for the methods of thought applied in those researches; it is thus a normative science. The problems of logic refer us back on the one hand to psychological inquiries, and on the other they carry us forward to the universal principles of knowledge and the modes of procedure of scientific inquiry. If the laws of logical thought are not to be accepted as inexplicable facts, their origin must be sought for in our subjective experience. Further, if these laws are to subserve the purposes of the quest of truth, the ground of their evidence must be examined and the conditions ascertained under which their application leads to actual knowledge. Finally, if logic is to assist the theoretical sciences, it must trace out the complicated forms which the logical laws take on in the actual methods of scientific research. Besides the expression of the logical norms Wundt, therefore, demands of scientific logic three things: a history of the psychological genesis of thought; an investigation of the foundations and conditions of knowledge; and an analysis of the logical methods of scientific research. To sum up, logic requires epistemology for its foundation and methodology for its completion.

After his short review of the forms which logic assumes in the hands of the great philosophers, which may be classified under the general heads of formal logic and metaphysical or dialectic logic, Wundt discusses the relations of logic to philosophy in somewhat the following terms. Formal logic is declared by its representatives to be the universal propædeutic of philosophy, and to be exempt from the dispute which hovers over all philosophical questions. But this advantage is obtained at the cost of its scientific character. Even if that were the main office of logic it would still fail of its purpose, for sceptics and dogmatists have frequently enough disputed the certainty of the logical norms as being simply empirical rules, and rationalists and empiricists have not infrequently accorded in the statement that those logical norms were worthless, as at best they simply taught how existing knowledge was to be ordered, and not how it was to be acquired. On the other hand, whilst formal logic placed itself outside of philosophy, the metaphysical logic pretended to be philosophy itself. It was an organon of thought in the fullest sense of the word, for its instrument created its subject-matter. By the principle of the identity of thought and being, logical thought developed by its own spontaneous movement the connexion of ideas: logic became metaphysics, which in its turn embraces all other philosophical disciplines as dependent provinces. Scientific

logic finally regards itself as a branch of philosophy, for philosophy seeks to resolve the problems which are common to the individual sciences. And these problems are of two kinds. They refer partly to the general content of knowledge, partly to its foundations and to the norms of its development. With the content of knowledge metaphysics busies itself. She expounds this content in general notions about being and in laws concerning its relations. Such notions and laws are, it is true, developed by the experimental sciences, and only subsequently handed over by them to philosophy, which subjects them to a final elaboration in order to bring the single facts and hypotheses in harmony with one another and with the general principles of cognition, and to complete them finally by means of further suppositions which are demanded by the connexion of the different provinces of experience. The aim of metaphysics, thus, is the creation of a consistent view of the world which will put all isolated knowledge into solid interconnexion.

As it is the office of metaphysics to present developed knowledge, so it is the office of logic to present developing knowledge, with the methods that lead to it and the means which human thought employs. The theory of knowledge might be given an independent middle place between logic and metaphysics as that discipline which is to investigate the content and not the methods of knowledge or its foundations and its limits. But with the establishment of this task the theory of knowledge is put into the most intimate relation with logic. For one of its principal tasks must be to examine with respect to their origin and certainty the logical norms and methods themselves. Logic, therefore, cannot dispense with the aid of epistemological inquiries. Similarly the fundamental notions and laws of scientific cognition stand in close relation to the general laws of thought, and here again the more complicated logical methods presuppose throughout principles which, like the notion of substance or the laws of causality, for example, are proper subjects of epistemological investigation. On these grounds it appears impracticable to separate from each other in an exposition of this subject the provinces of epistemology and scientific logic.

Assigning to logic, therefore, this more general significance, logic and metaphysics are the two halves of theoretic philosophy. But logic is that half which stands in more intimate relation with the single sciences. With metaphysics this relation is a one-sided one. She is compelled to learn from empirical research, whilst the latter in its collection of facts and in the development of provisional hypotheses need take no account of metaphysical requirements. With logic, on the other hand, the relation is throughout a reciprocal one. From the modes of mental procedure and of research as actually practised, logic abstracts its general results; afterwards, however, it hands over these general results to the individual sciences as binding norms, to which at the same time it adds rigorous conclusions with respect to the certainty and the limits of cognition which, if it neglect, special research will be easily led away from its assured foundations to end up in groundless doubts or in crude metaphysics.

With this the substance and the differences of the two systems are sufficiently emphasised, to admit of comparisons, which the reader may draw for himself.

T. J. McC.

THE PSYCHIC FACTORS OF CIVILISATION. By *Lester F. Ward.* Boston: Ginn & Co. 1893. Price, $2.00. Pages, 369.

This work is intended as a contribution to both psychology and sociology, and attempts to place "over against the purely physiological economy" a psychological economy. "For," says the author, "human society which is the highest product "of evolution, naturally depends upon mind which is the highest property of mat-"ter" (p. 3).

Mind is possessed of two sides, viz., of feelings and emotions, or the subjective side, and of the intellect, or the objective side. Thus the work naturally divides itself into three parts: (1) the subjective factors, (2) the objective factors, and (3) the social synthesis of the factors. The first part undertakes to show that the true forces of society are psychic; the second part explains the directive agent controlling the social forces, which is also psychic, being the objective side of mind or thought. The third part points out how the social forces, under the control of the directive agent, have established society.

This in great outlines is the plan of the work, which is clear and recommendable; but the reader is confronted with difficulties as soon as he enters into the details of the exposition, and we must confess that in glancing through this book we are more than ever impressed with the desirability of having in psychology definite and commonly accepted terms. The terms "psychic" and "mental" may mean the same, or they may not. Emotions and feelings on the one side, and intellect on the other, are represented as "the obverse and reverse of the same coin." Yet is intellect said to "embrace the entire thinking part of the mind, all of mind that "is not feeling" (p. 225). That which constitutes the nature of thought is not the feeling element of thought; nevertheless, there can be no thought which is not at the same time feeling. Mr. Ward says, "The common expression, unconscious, feeling,' is a "contradiction of terms"; yet he classifies sensations into (1) "pleasurable and painful," (2) "conscious and unconscious" (p. 125). Are not "sensations" included under the head of "feelings," and if there are no unconscious feelings, how can there be unconscious sensations? We should say that "consciousness" is a peculiarly intensified state of feeling and have no objection to speaking of subconscious or dim and even unconscious feelings.

Emotions are characterised as "secondary sensations"; they are "reflected "from the brain along special nerve-fibres to certain specialised emotional ganglia "within the organism," and are said to have their seat in the sympathetic system—a theory that is scarcely tenable on physiological grounds. Schopenhauer, who in spite of his genius was not free from certain metaphysical and telepathic supersti-

tions, was inveigled into holding a similar belief because somnambulists place books, which they pretend to read with closed eyes, upon their stomachs.

The most serious deficiency in the treatment of terms is Mr. Ward's omission of a description of the nature of mind. A definition of mind would, in our opinion, be most indispensable in a psychological sociology, but we can find no allusion to the subject, except that mind is said to be the highest property of matter. And it appears that Mr. Ward regards mind as incapable of explanation, for he adds, when speaking of intellect on page 225, "that any property involves mystery." It is true that we do not know why quinine is bitter, but suppose we knew the molecular constitution of the papillæ on the tongue, and the chemical action of quinine, sugar, vinegar, and other substances upon the papillæ, would it not be probable that we should come to understand why sugar has a sweet and quinine a bitter taste, in the same way as we know why the seventh in a melody produces the sentiment of expectation and unrest, while a return to the keynote is accompanied with a feeling of satisfaction. Certainly we do not as yet know the molecular form which produces sentiency, but we do know that it depends on a peculiar kind of interaction, such as can be observed in protoplasm. Certainly, we cannot say that it is mysterious because all the properties are mysterious. Mysterious though it is at present, the time may come when we shall understand the conditions of sentiency, as well as those of many other properties, for instance, the transparency of glass, which presupposes a molecular arrangement permitting the transmission of ether-waves without disturbance. Now, the nature of mind is by no means mysterious or unknown, nor are we justified in regarding it as a mere "accident" (see p. 89). Mind is the natural and necessary outcome of sentiency. Suppose the world, which in its objective aspect appears as matter moving in space, to be throughout possessed of subjectivity exactly proportionate to the form of its objectivity: will it not necessarily cause mind and intellect to appear in the subjectivity of those combinations which preserve in the flux of their activity the forms of former impressions so as to admit of their revivification. Memory in sentient structures is the condition of mind, and memory is not a mysterious quality: it is the preservation of sentient forms. Mind originates as soon as various revived feelings acquire meaning representing the causes which excited them as external objects.* It is a great pity that Mr. Ward has neglected memory and the paramount importance of the rôle it plays in the production of mind and intellect.

While Mr. L. F. Ward upon the whole shows many influences of Schopenhauer, we cannot say that he is just toward his pessimism. Schopenhauer's pessimism is one of the most powerful philosophies of all ages, and is not merely "the negation of pleasure" (p. 64). We should prefer to characterise it as the doctrine which teaches, on the one hand, the vanity of pleasure, and on the other hand, the inevitableness of pain, thus coming to the conclusion that life is not worth living. Mr.

* See my *Soul of Man*, Chap. I.

L. F. Ward says: "The answer to pessimism comes from psychometry. . . If the "act of gratifying a desire were absolutely instantaneous, there would be no answer "to the pessimist" (p. 65). But "in psychics as in physics no phenomenon can "take place except in time, . . . and the act of satisfying a desire may be consider- "ably prolonged, or in certain cases almost indefinitely continued. . . . In the pri- "mary physical form of satisfying love it is only momentary, in the secondary "spiritual form it seems to be indefinite in time" (p. 68). "What is true of love is "true also of other permanent pleasures and enjoyments. They are real at least to "the subjects of them, and there is every reason to consider them objectively real. "And this is the refutation of pessimism" It is to be feared that this refutation will convert no adherent of Schopenhauer. The reality and relative permanence of happiness does not remove pain, sickness, old age, and death; nor does it dispose of the vanity of pleasure. The truth of pessimism lies too deep to be overcome by Mr. Ward's arguments!

We agree with Mr. Ward that both pessimism and optimism must be abandoned and that meliorism is to be accepted; but the meliorism which we propose is different in one important point from his. James Sully describes George Eliot's meliorism as "a faith which affirms not only our power of lessening evil—this nobody questions—but also our ability to increase the amount of positive good." And Mr. L. F. Ward's meliorism is not an ethical but a dynamic principle. In our opinion a belief in the increase of the amount of good—which can as little be doubted as the lessening of evil—cannot overcome pessimism; for the happiness of the world is thereby not considerably, perhaps not at all, increased. While some evils are lessened, others are increased, and still others originated that did not exist. Happiness depends upon the satisfaction of wants and as every satisfaction begets new wants, the progress of evolution will naturally increase the sensibility to pain at least in the same degree as the pleasures of satisfying our wants. Progress intensifies everything, our happiness and also our misery, and we cannot help considering the belief in a millennium upon earth as an empty dream. We believe that pessimism is irrefutable to him, who, like Mr. L. F. Ward, regards happiness as the aim of man's life (Chap. XIII), and "pain in and of itself as an evil—the only evil" (p. 40). Consider but two of the quotations prefixed to Chap. XI, one by the old Goethe whose life had been one of the happiest on earth, who says, "*ich kann wohl sagen dass ich in meinen fünfundsiebzig Jahren keine vier Wochen eigentliches Behagen gehabt,*" and another from Humboldt's memoirs, "*das grösste Glück ist noch das, als Flachkopf geboren zu sein.*"

There is in our opinion but one escape from pessimism which is Buddha's time-worn and ever new solution of the problem, whose doctrine may briefly be summed up in the injunction "to surrender all thought of self and to walk in the noble path of righteousness." Mr. L. F. Ward's meliorism is only a new formulation of optimism, and the truth of it is, to say the least, very doubtful. The ethical meliorism, however, fully recognises the truth of pessimism and overcomes pessimism by

surrendering from the beginning all those illusions the impermanences of which are complained of. The improvements of a "dynamical meliorism" are good and welcome, but they are of no avail to him who has not as yet understood the vanity of pleasure and the emptiness of a life devoted to the interests of self.

Mr. L. F. Ward makes some good remarks on the function of pain but his inferences go too far. He speaks of "the purpose [sic!] for which feeling was created," which he supposes "to consist of pleasure and pain" (p. 39), repeating the word "purpose" not only on the same and on the following page, but in other passages. He maintains that pleasure and pain are the products of natural selection or of the survival of the fittest, saying:

"Pleasure and pain are the conditions to the existence of plastic organisms, "pleasure leading to those acts which insure nutrition and reproduction, and pain "to those which will insure safety."

Pleasure and pain are undoubtedly important factors in the evolution of the animal world, but the kingdom of plants demonstrates that the existence of plastic organisms with complex systems of nutrition and reproduction and also devices for safety is possible without pleasure and pain. Pleasure and pain have not been created for any purpose or because life would not be possible without them; must we not rather assume that the world consists of potential feeling and that it actually appears in animal plasma?

Mr. L. F. Ward speaks much of an omitted factor which, for lack of a better name, he calls "intuition." Intuition is characterised as an undecomposable mental act, absolutely simple and undifferentiated. He likens primary intuition to protoplasm or the simplest protozoans (p. 274). It is apparently the same as Kant's *Anschauung*, and is by no means an omitted factor in psychology, notwithstanding Mr. L. F. Ward's disclaimer, who says, "I am not aware that Kant has ever applied it to the primary and practical quality of mind here described . . . . it is with him a purely metaphysical conception" (p. 146). Any one who finds in Kant's term *Anschauung* any metaphysical meaning will be sure to misunderstand the fundamental doctrines of his "Critique."*

In the third part Mr. L. F. Ward contrasts what he calls the economics of nature and of mind, the former being based upon the actions of the human animal and the latter upon the actions of the rational man. "The former is the system of the physiocrats, Adam Smith, Ricardo, Malthus, Herbert Spencer, and the modern individualists. The latter was foreshadowed by Auguste Comte but has never taken any systematic shape except in 'Dynamic Sociology,'" a former work of Mr. L. F. Ward's. Mr. Ward here understands by *nature* "all classes of phenomena, whether physical, "vital, or even psychic, into which the intellectual or rational element does not "enter, while the word *mind* will, for the sake of brevity, be employed in the some-"what popular or conventional sense of rational or intellectual, the two terms thus

* See the article "What does Anschauung Mean? in *The Monist*, Vol. II. No. 4, pp. 527-532.

"mutually excluding each other, and taken together covering all possible phenom-"ena." We have our doubts whether the economists of nature, so called, deserve Mr. L. F. Ward's criticism. They were neither blind to the wastefulness of nature in comparison with human foresight nor did they ignore in their systems that social states are constituted by sentient and rational beings. What Mr. Ward does not seem to appreciate is that nature, even in the narrow sense in which he defines it, and mind do not exclude one another, and that natural laws govern even our mental acts, our desires and purposes together with the entire growth of social organisms. The members of a society are all conscious and rational beings; they pursue their aim and make their plans, but they cannot with impunity replace the natural laws governing the social relations by artificial schemes. There is no such contrast between nature and mind as Mr. L. F. Ward seems to assume in his definition; nor are the teleological aspirations of man in any sense a reversal of the natural processes but only a higher and more perfect stage of nature. We cannot artificially devise them but must invent them, for unless they agree with and are based upon the natural laws of the social growth, they will be unavailable.

Mr. L. F. Ward proposes to replace the old systems of society, "autocracy, aristocracy or democracy or even plutocracy," by sociocracy. Democracy is the last phase through which all must pass to reach sociocracy. By sociocracy the author understands a government purely in the interests of society. "All democratic governments are largely party governments"; sociocracy will do away with parties and attend to the business of the people in a business-like way. This, however, does not mean socialism, which Mr. L. F. Ward regards as being based "upon pure theory and *a priori* deductions." He says:

"It is the special characteristic of the form of government that I have called "sociocracy, resting, as it does, directly upon the science of sociology, to investigate "the facts bearing on every subject, not for the purpose of depriving any class of "citizens of the opportunity to benefit themselves, but purely and solely for the "purpose of ascertaining what is for the best interests of society at large."

Mr. L. F Ward is an author whose literary and personal accomplishments have given him a well deserved prominence all over the States and especially at his home, Washington. His book treats a subject of great importance; and although we cannot agree with many of its most fundamental tenets we recommend its study and cannot but say that it is full of valuable and suggestive thought. P. C.

THE INTRA-CRANIAL CIRCULATION AND ITS RELATION TO THE PHYSIOLOGY OF THE BRAIN. By *James Cappie*, M.D. Edinburgh: James Thin, 54 and 55 South Bridge. 1890. Pp. 188.

"My aim in the following pages," says the author, "has been to give a contri-"bution, on the one hand, to intra-cranial physics, and on the other to mental "physiology." His method might be called the philosophical method, which forestalls, but does not preclude experiment. "I shall not despair to show," he says,

"that by the method I intend to pursue, more light may be thrown on the physiol-
"ogy of the brain than can in the meantime be expected from any analysis of its
"structures, however minute and accurate that may be. . . . The revelations of
"minute anatomy are too frequently only isolated links. They furnish interesting
"facts, rather than the explanation of wider phenomena. They show us instru-
"ments, but not action. . . . No analysis of sea-water would ever explain the flow
"and ebb of the tide; nor will the microscope or test-tube ever explain the flow
"and ebb of consciousness. *Possibly, however, some measure of success may be gained*
"if we hold the brain, as it were, at arm's length, and take a bird's-eye view of its
"more palpable relations."

With respect to subject, the author's contention is, that *the physiological bearing of the brain's surroundings* has not received in late years the attention it deserves. The cranium has hitherto been regarded simply as an organ of protection. "It is "more than likely, however, that, as I shall afterwards attempt to show, the prop-
"erties of the skull exert a positive influence on the physiological action of the brain
"itself. Then, what indeed appears not a little surprising, is the circumstance that
"*the peculiarities of the encephalic circulation*—so numerous and so striking—now
"receive less attention than they did in the early years of the century. It is with
"some hope of reviving interest in these peculiarities, and to point out certain
"modes in which they can exert an influence on the brain's activity, that I now
"venture to submit the following essays."

Dr. Cappie prefaces his investigation with a few pages upon the philosophy of physical causation, which he considers simply in the physical point of view. In the main he takes the modern scientific view of cause, holding that in the investigation of physical phenomena we must not substitute a general term for facts. For example, the true scientist does not attempt to grapple with an entity *life* but with the conditions which go to constitute something *living*. An example analogous to this which bears upon the chief points of his investigation is that of "sleep." It is frequently stated by physiologists that sleep must be regarded as the cause rather than as the consequence of the so-called cerebral anæmia which obtains in the substance of the brain during repose. But to speak of sleep as a cause is substituting a general term for conditions of fact. Also, "no law, however universal, is the cause of any event." With respect to these points Dr. Cappie is very clear, and no philosophical psychologist will withhold his assent to this position. But if "life," "sleep," etc., cannot be causes, can "energy" be a cause? Dr. Cappie seems to think so, for he says, "energy itself is alone privileged to exercise actual power, and, therefore, sole efficient cause." The objection to this cannot be made too strenuous. Energy is an abstract physical concept, as life is an abstract biological concept. The realities it represents are masses in actual or possible motion, mathematically expressed. It, with matter, is no more the fundamental objective reality (despite Professor Tait's assertion) than is the theological notion of God. If this were seen, Dr. Cappie would not say that energy is mysterious, nor that motion is

something apart from energy. The mystery is the hypostatisation of an abstract idea—viz., energy.

On the question of the correlation of mind and brain also Dr. Cappie is clear, holding, not that the two are identical, but simply that every form of mental activity must have its somatic side. It is, as we have seen, the special question of this book to give prominence to the circulation as one of the essential factors in conditioning the brain's activity. "The blood is to the grey matter of the brain what atmospheric air is to fuel in ordinary combustion." A consideration of the laws of this circulation, says the author, is of first importance in any attempt to take a comprehensive view of the brain's physiology. But on this subject there is a gap in physiological and psychological works. However, the circulation within the skull contrasts so remarkably with that of other parts of the body that the peculiarities presented cannot help possessing some definite physiological significance. Dr. Cappie then devotes a number of pages, adorned by three beautiful plates, to a lucid exposition of intra-cranial circulation, the results of which are that in the brain the quantity of blood is larger in proportion to the size of the organ nourished than in other parts of the body; that the larger arteries communicate with one another more freely here than in other parts; that the circulation of the brain mass is practically capillary; that the larger veins and arteries lie apart from one another; and that the venous blood is transmitted through channels with tough, inelastic walls.

After showing that the circulation of the brain is in part capillary, and that its rapidity varies with the requirements of nutrition, that the mass of blood within the cranium is practically uniform, and that the pressure of the atmosphere upon the contents of the cranium is an important factor, the author comes to the causation of sleep. This is the chief theme of the book. We shall state his hypothesis in his own words. He says: "We have not one or two, but a combination and succession of conditions inseparably linked together. The first change is a modified—a less energetic—movement in the molecules of the brain tissue; the last is compression of the whole organ. From lessened activity of the molecules spring a less active state of the capillary circulation and diminished stress through the cranial cavity. Next, we have a change in the balance of the encephalic circulation, in producing which the weight of the atmosphere, causing backward pressure in the cerebral veins, is an essential agent. The circulation in the brain itself is diminished; its vessels become comparatively empty, and to a corresponding extent the proportion of blood in the veins is increased. With the altered balance of the circulation there is a change in the balance of active pressure; it is less from within and more on the surface; it is less expansive and more compressing. With a certain amount of compression consciousness is suspended." For the full details we must refer the reader to the work itself.

In the eighth section of the book the author considers "how the peculiarities of the encephalic circulation may affect the mode or outcome of functional activity in the brain itself." The immediate seat of any activity must have its vascu-

larity increased, and as a consequence some other portion of the brain must become less vascular. Secondly, a certain amount of pressure must be exerted on the surrounding tissues which will produce a more rapid movement of the blood current. Take attention. In the state of indifference the encephalic circulation will have a certain balance. If an impression is made on some sensory surface of sufficient strength to secure attention, the vascular activity of the part receiving the impression will be increased. So with attention. Its cerebral correlation is the focussing of the encephalic circulation in the direction of the activity, the increased activity of the circulation reacting on the energy of the tissue, thus making the mental effect produced stronger. "The momentum of the circulation is now directed towards "the centres of ideation and voluntary motion, and that implies derivation from "and consequent weakening of functional vigor in the sensory ganglia."

Similar applications are made to explain other familiar phenomena of mental physiology, including hypnotism. His principles, the author states, may also be applied to hysteria and other forms of insanity.

It is not within the province of *The Monist* to pass judgment upon special researches of this character. In the formulation of his problems, and in the clear emphasis of the points at issue, Dr. Cappie's method reminds us of Ribot. Also, with respect to the influence of anatomical characters on physiological and correlatively on psychical action, the idea of the author is related to the remarks of M. Binet, on a different subject, presented in Vol. III, No. 1, and Vol. IV, No. 1, of *The Monist*. But whatever their ultimate worth—which experience, if not experiment, will sometime determine—the reader of Dr. Cappie's work will find his conclusions clearly and undogmatically put, and will not regret the time spent upon its perusal.

THOMAS J. MCCORMACK.

SOCIAL EVOLUTION. By *Benjamin Kidd*. New York and London: Macmillan & Co. 1894. Pp. 348. Price, $2.50.

It is one of the chief results of Mr. Kidd's meditations that the evolution which is slowly proceeding in human society is not primarily intellectual but religious in character. "It would appear," he says, "that when man became a social creature "his progress ceased to be *primarily* in the direction of the development of his in- "tellect. Thenceforward, in the conditions under which natural selection has ope- "rated, his interests as an individual were no longer paramount; they became sub- "ordinate to the distinct and widely different interests of the longer-lived social "organism to which he for the time being belonged. The intellect, of course, con- "tinues to be a most important factor in enabling the system to which the individ- "ual belongs to maintain its place in the rivalry of life; but it is no longer the "prime factor. . . . The race would, in fact, appear to be growing more and more "religious, the winning sections being those in which, *cæteris paribus*, this type of "character is most fully developed."

In speaking of the Utilitarian conception of ethics, which he rejects as incon-

sistent with the teachings of evolutionary science, Mr. Kidd well says that "The "greatest good which the evolutionary forces, operating in society, are working out, "is the good of the social organism as a whole. [But that] *the greatest number in "this sense is comprised of the members of generations yet unborn or unthought of, to "whose interests the existing individuals are absolutely indifferent.*" His own idea of the teaching of evolutionary science as applied to society is "that there is only "one way in which the rationalistic factor in human evolution can be controlled; "namely, through the instrumentality of religious systems. These systems consti- "tute the absolutely characteristic feature of our evolution, the necessary and in- "evitable complement of our reason. It is under the influence of these systems "that the evolution of the race is proceeding; it is in connexion with these systems "that we must study the laws which regulate the character, growth, and decay of "societies and civilisations."

The author disclaims any pretension to treat the subject of the evolution of society "in its relations to that wider field of philosophical inquiry of which it forms a province." This may, perhaps, explain Mr. Kidd's contention that those who aspire after a rational basis for individual conduct in society are in pursuit of something which can never exist. "There can never be," he says, "such a thing as a "rational religion. The essential element in all religious beliefs must apparently "be the *ultra*-rational sanction which they must provide for social conduct. . . . "*No form of belief is capable of functioning as a religion in the evolution of society "which does not provide an ultra-rational sanction for social conduct in the individ- "ual.* In other words: *A rational religion is a scientific impossibility representing "from the nature of the case an inherent contradiction of terms.*"

Mr. Kidd holds this view because of his definition of religion which is: "*A re- "ligion is a form of belief, providing an ultra-rational sanction for that large class "of conduct in the individual where his interests and the interests of the social organ- "ism are antagonistic, and by which the former are rendered subordinate to the latter "in the general interests of the evolution which the race is undergoing.*"

If you say to him, "Here is a religion, scientifically deduced, with no supra-rational sanction," he will answer, 'That religion is not a religion because it is not 'a social phenomenon. It has not proved itself to be a religion. It has not in- 'fluenced and moved large masses of men in the manner of a religion. If you wish 'to accept this system as a religion you may, but you do so merely on the *ipse dixit* 'of a small group of persons who chance so to describe it.'

In a sense this is true. Not every wild scheme of conduct or view of the world is a religion. To be such, it must be proved. But admitting that the proof must be more than individual, it does not necessarily follow that it must be historical. When Buddha reached his solution of the religious question, was it or was it not a religion? According to Mr. Kidd, it was not; but the fact is, it was. Buddha's proof was deduced from the logic of facts, just as the proofs of the scientific schemes of religion, which Mr. Kidd repudiates, claim to be deduced. Whether the deduction

is correct is another question; but at any rate it is a subject of reason. Says Buddha ("Mahâtaṇhâsakhaṃya Sutta, Majjhima Nikâya," Vol. I. p. 265): "If ye now know thus, and see thus, O disciples, will ye then say: We respect the Master, and out of reverence for the Master do we thus speak?"—"That we shall not, O sire." — . . . . "What ye speak, O disciples, is it not even that which ye have yourselves known, yourselves seen, yourselves realised?"—"It is, sire." Here is a religion without a supra-rational sanction for conduct. And the fact goes to disprove Mr. Kidd's whole theory.* T. J. McC.

PAIN, PLEASURE, AND ÆSTHETICS. An Essay Concerning the Psychology of Pain and Pleasure, with Special Reference to Æsthetics. By *Henry Rutgers Marshall*, M.A. London and New York: Macmillan & Co. 1894. Pp. 359. Price $3.00.

The main idea of this book is to treat æsthetics as a branch of hedonics; art is viewed as a species of pleasure, and artistic enjoyment is defined as that kind of pleasure which is relatively permanent in revival (Chap. III). This classification, simple though it is as stated in its generality, is defended by the author with elaborate circumlocution by investigations into the psychology of the phenomena of pleasure and pain, for which he coins the new word *algedonic*† (derived from ἄλγος and ἡδονή). The first chapter (pp. 1–62) contains a discussion of feeling, emotion, *Gefühl*, *Empfindung*, *sensibilité* in their relation to algedonic phenomena; the heory that "pleasure and pain are qualities of a most general nature, either one of which may, and one of which must, belong to each psychic element which is differentiable" (p. 61) being proposed as a working hypothesis. The fourth and fifth chapters discuss the much mooted problem of the physical basis of pleasure and pain. We read on page 169 (repeated on p. 194), "The activity of the organ of any content if efficient is pleasurable, if inefficient is painful." Efficiency or inefficiency are described as "functions of the relation between activity and nutrition, pleasure being dependent upon the use of surplus stored force and pain upon conditions under which the outcome of the organ's activity is less than should be expected in consideration of the energy involved in the stimulus." This view seems to us wholly inadequate to cover the facts to be explained, but the author not only finds some corroboration of it, but also trusts it "to be in line with the important position maintained in Chapter I, namely that pleasure and pain are general qualities" as stated above. In the second chapter the author protests against identifying the emotions with pleasure and pain phenomena (p. 90 and 94–95), calling the former "representative pleasures and pains" and defining them as "the psychic coincidents of relatively fixed co-ordinated

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* Mr. Kidd says the notion of *Karman* is the ultra-rational sanction of Buddhism, and with this dismisses this religion as fitting in with his theory. But the kernel of the idea of *Karman* is certainly not ultra-rational, unless the theory of heredity and evolution are so.

† *Algedonic* (to be pronounced "alg-hē-do'nic," not "al-je-donic") would have been more appropriate.

instinctive activities arising upon the appearance of definite objects." The sixth chapter applies the author's theories to what he calls "algedonic æsthetics." Mr. Marshall is aware that "the evidence presented is not crucial," but he is satisfied that "in pushing the theory to its conclusions serious oppositions have not been developed." Nor is it probable that any opposition ever will develop to Mr. Marshall's theories, but we doubt their helpfulness and practical use in the domains of science and art, to the reconciliation of which the work is laudably dedicated. K.

EMPFINDUNG UND BEWUSSTSEIN. Monistische Bedenken von *B. Carneri*. Bonn: Emil Strauss. 1893.

It is Mr. Carneri's purpose in this pamphlet to present to the philosophical world the objections which have arisen in his mind affecting the purity of the modern monistic view of the world. Monism, he claims, is scientifically established; the only problem left is *what kind* of monism must be accepted. Mr. Carneri's "objections" are chiefly levelled against the doctrines which claim that mind is simply a side or aspect of matter, and not a function of it; these doctrines logically imply, he thinks, the existence of a nervous system or organisation in all matter, and also a complete unity of nervous and conscious activity, which is absurd. Mind is not, however, an achievement of matter *per se*, but of matter as a *human organism*.

His position apparently implies (1) materialism and (2) agnosticism. But the first is refuted by the fact that in the idealistic view all matter is a simple notion of the mind; and with respect to the second (we quote from a private letter on this subject from the author to the editor of *The Monist*), Mr. Carneri says he will not accept the appellation of "Agnostic," unless he is forced to do so. He does not regard himself as one. He has a very exalted conception of knowledge, which to him is paramount to all, and he says with Kant that it is absolutely incalculable how far man can still penetrate into the secrets of nature. What Mr. Carneri, with Kant, does not regard as belonging in the sphere of human knowledge, because surpassing experience, is the "thing-in-itself" in all its protean aspects. True, he does not use the term "thing-in-itself," and regards it as unfortunate that Kant brought the term into circulation, because it can be, and is, very easily understood, for example by Schopenhauer, as something which has a peculiar essence of its own. Mr. Carneri admits that if he used the expression in this sense one would have every reason for charging him with dualism. But Kant did not understand the expression in this sense, and even characterised this idea of it as a bugbear of the intellect. Things, Mr. Carneri maintains, are simply complexes of sensations. What he calls the "in-itself-existence" of things is that which the things would be if we conceived them severed from our sensations. But of what this is we can acquire no knowledge since it transcends all possible experience, in so far as our experience and with it our knowledge in the last instance leads us back to our sense-activity as to *our own* sensation. With Kant, Mr. Carneri invests things with materiality as a fundamental attribute, while he also classes himself (his feeling) among things. He

ascribes to matter those qualities which all things have in common and which he feels they have. He must assume matter, since otherwise all things, including himself, would be naught, or at best mere ideas, such as Berkeley constructed. What he knows of matter, he knows only through his sensation, and for that very reason he cannot know what matter in itself can be, that is, matter severed from sensation. If this is a subject of knowledge—which he cannot grant, then, and then only, is he an agnostic.

With respect to the religious outcome of his doctrines, we may say that though Mr. Carneri recognises the Religion of Science as a product of perfect correctness of thought, and as the only religion that does not conflict with the present state of our knowledge, yet he thinks that for that very reason the religious element in it is a so exalted one that the religious minds who are satisfied with it must be in the highest sense of the word *élite* human beings. Mr. Carneri admits the statement that man consists of his ideas, his influences, and his aspirations. It depends, therefore, upon *the idea of immortality* which one possesses whether one can be satisfied with the idea of immortality of this religion. Personally, Mr. Carneri has no need of religion or immortality whatsoever, and is so reconciled to the belief that his personality will wholly cease with death that it is to him a blissful certainty. It is a source of real delight to him, he says, and an encouragement to good deeds, to be able to think that some of his achievements will continue after his death to have a beneficent influence on others, in no matter how insignificant a way. But his personality, which will then no longer exist, will have as little share of these as he should have, in his present life, of freedom or property, if he should be robbed of these and others should enjoy them in his place.

These remarks will indicate the general drift of Mr. Carneri's doctrines. *μ.*

INTRODUCTION A LA PSYCHOLOGIE EXPÉRIMENTALE. By *Alfred Binet*. Paris: Felix Alcan. 1894. Pp., 146. Price, fr. 2.50.

There has long been a lack in English of a practical treatise of experimental psychology, and although we notice that two are in preparation—one from the pen of Professor Cattell,—the student, until the appearance of these, may be referred to the present easily-read French work of M. Binet as the best accessible manual of the subject. The volume is a collaboration in a certain measure, parts of it having been written by M. Phillippe, M. Courtier, and M. Victor Henri. Its descriptions refer chiefly to the psychological laboratory of Paris, which is attached to the École des Hautes-Études, and to the psychological laboratories of Germany. M. Binet does not profess to know much about the organisation of the numerous laboratories of America, but his ignorance does not diminish the worth of his instructions, as the methods of this study must be essentially the same in all parts of the world. M. Binet mentions the existence of psychological laboratories at two American cities, Medissona and Chompen,* of which we have never heard. Chapter

[1] Probably Madison, Wis., and Champaign, Ill.

I is devoted to the laboratories of psychology; Chapter II treats of Psychological Methods; Chapter III of Sensations, Perceptions, and Attention; Chapter IV of Movements and Will; Chapter V of Memory; Chapter VI of Ideation; Chapter VII of Psychometry; Chapter VIII of Methods of Observation and of Interrogatories. There is a description in the book of Hipp's chronoscope, which even Külpe's work lacks, as also of the common methods of registration and of the other stereotyped procedures. "Experimental psychology," M. Binet says, "is autono-"mous and has been definitively organised into a distinct and independent science. "It is independent of metaphysics, but it does not exclude all metaphysical results. "It supposes no particular solution of the great problems of life and of the soul. It "has no special drift, spiritualistic, materialistic, monistic, or otherwise; it is a "natural science, and nothing more." *μ.*

THE CIVILISATION OF CHRISTENDOM AND OTHER STUDIES. By *Bernard Bosanquet.* London: Swan Sonnenschein & Co. 1893. Pp., 383. Price, $1.50.

The Ethical Library, of which this book is the first number "is not," its editor says, "a new 'Science Series.' It will not contain books on moral science properly so called. The chief results of the modern study of mind and morals will for the most part be assumed without scientific demonstration. The guarantee to the public that the underlying principles are not *mere* assumption or isolated *aperçus* must be the names of the writers themselves, who, it is hoped, will be recognised as specialists in particular departments of mental and moral philosophy." Other volumes in this library have been promised by Prof. Henry Sidgwick, Mr. Leslie Stephen, Mr. D. G. Ritchie, Mrs. Sophie Bryant, and the Editor, J. H. Muirhead. Mr. Bosanquet's book is a collection of addresses delivered by him before various English societies, and of essays recently published in ethical periodicals. Their titles are as follows: "Future of Religious Observance"; "Some Thoughts on the Transition from Paganism to Christianity"; "The Civilisation of Christendom"; "Old Problems under New Names"; "Are we Agnostics?"; "The Communication of Moral Ideas as a Function of an Ethical Society"; "Right and Wrong in Feeling"; "Training in Enjoyment"; "Luxury and Refinement"; "The Antithesis Between Individualism and Socialism Philosophically Considered"; "Liberty and Legislation." Our readers will derive pleasure and profit from the perusal of these essays of Mr. Bosanquet, who has here expressed his opinions upon some important ethical and social topics with much grace and art. *μ.*

DIE PHILOSOPHIE DES NICOLAUS MALEBRANCHE. By *Dr. Mario Novaro.* Berlin: Mayer & Müller. 1893.

This little book (107 pages) is a clear and enthusiastic presentation of the philosophy of Malebranche, a subject on which Dr. Novaro has also written in Italian. Bruno, not Bacon, nor Descartes, claims Dr. Novaro, is the father of modern philosophy; it is he who pointed out the true paths which modern philosophy, and in

fact all philosophy, must follow. But Bruno's position is an ideal one. He found no worthy son, either at home or abroad. Bacon exercised little influence either on continental or on English philosophy, and his position in the world of thought is much overestimated. Neither Locke, Berkeley, nor Hume, are followers of Bacon, but rather of Hobbes, Descartes, and Malebranche. The greatest influence on Continental and English philosophy before Kant was unquestionably exercised by Descartes and Malebranche. But Descartes never fully elaborated or systematised his philosophy. It was left to Malebranche to construct from the Cartesian fragments a universal and harmonious system. Before Kant there are but three systems of modern philosophy : that of Hobbes, that of Bruno and Spinoza, and that of Malebranche.

This is Dr. Novaro's view of the trend of modern philosophy. The book is written in a very pleasant style ; its author shows a wide acquaintance with the philosophical literature of all European nations and puts both the character and thought of Malebranche in a very clear light, correcting many errors which are current with respect to this philosopher, and not omitting to present just criticisms of his views. The philosophy of Malebranche, says Dr. Novaro, is a magnificent and consistent system if we admit its fundamental premise—the identity of thought and being. But this premise is contested. μκρκ.

STOICS AND SAINTS. Lectures on the Later Heathen Moralists, and on some of the Aspects of the Life of the Mediæval Church. By the late *James Baldwin Brown*, B. A , Minister of Brixton Independent Church. London and New York : Macmillan & Co. 1893. Pp. 296. Price, $2.50.

The subjects of the ten lectures which constitute this volume are as follows : "The Later Age of Greek Philosophy and the Epicurean and Stoic Schools"; "Epictetus and the Last Effort of the Heathen Philosophy"; "Marcus Aurelius, and the Approximation of the Heathen to the Christian Schools"; "Why Could not the Stoic Regenerate Society?"; "The Monastic System, and Its Relation to the Life of the Church"; "St. Bernard, the Monastic Saint"; "St. Thomas of Canterbury,—the Saint as Ecclesiastical Statesman"; "St. Francis of Assisi, and the Rise of the Mendicant Orders"; "St. Louis of France,—the Saint in Secular Life"; "John Wyclif, and the Dawn of the Reformation." The lectures were delivered at various times and at various places during the later years of Mr. Baldwin Brown's life, and are now published at the desire of many who heard them, with but slight alteration. They make no pretensions to systematic historical exposition. μ.

WISSEN UND GLAUBEN. By *Dr. C. Güttler*. Munich : C. H. Beck. 1893.

The point of view of this work is the point of view of faith. The author, a Privatdocent in the University of Munich, characterises his position as comparative eirenics. With regard to knowledge, in so far as it is human scientific knowledge,

Dr. Güttler seems to be slightly agnostic. Also, he believes that the biblical account of creation is reconcilable in its main outlines with the Darwinian theory of evolution, and his idea of immortality, although it rejects the notion of heaven as an idealistic earth is still that of a "linear continuation of personality," in which the animal soul does not share, because the animal does not possess ideals, does not exhibit mental progress or uninterrupted causal connexion of mind, in other words, does not possess civilisation. This argument seems to support the idea of immortality in the race only. But the author does not stop at his philosophical conclusion but continues and claims with St. John, xi, 25, "I am the resurrection and the life," and so forth. *μκρκ.*

ZUR VERJÜNGUNG DER PHILOSOPHIE. Psychologisch-kritische Untersuchungen auf dem Gebiet des menschlichen Wissens. By *I. Segall-Socoliu.* Erste Reihe: Das Wissen vom spezifisch Menschlichen. Berlin: Carl Duncker. 1893.

So far as we can infer from a production which lacks a preface and introduction, this book is the Prolegomena of the *first* of a series of philosophical works, planned to appear in three groups. The first series or group treats of the knowledge "of the specifically human"; it will be concluded by a volume, perhaps by more than one volume, on the "Psychology of Philosophising," which is the relative final aim of the past evolution of the world: *Tantum scimus, quantum sumus; quantum scimus, tantum sumus.* The second series will treat of the psychology of social development; the third, of our knowledge of "the universally physical." The Prolegomena are a collection of critical remarks on the chief questions of philosophy. Both in the psychical and physical domain the author arrives at a so-called principle of "unity in diversity," or rather of "unity in *separateness*"; mother and child are one, sun and earth are one, earth and moon are one; unity in separateness is the basis of all action; this is given off from, or emanates from, that: the aim and purpose, therefore, of action in life is that this unity shall be reattained; things and action have thus an affinity with their origin, which affinity bears within it an aim,—the aim of re-unification. Those who read this work will at least be stimulated to *hard* thought on the subjects of which it treats; but the form in which its ideas are put is a rigid and not inviting one. The author is a Roumanian. *μκρκ.*

THE ETHICS OF SERVICE. By *Frank Sewall, M. A.* London: James Speirs, 36 Bloomsbury Street. 1888. Pp. 32.

This clearly written and elegantly got up pamphlet was read as an essay before the Ruskin "Society of the Rose" in Glasgow, 1888. The power of the universe which compels conformity with natural law on penalty of misery and death, variously termed God, Nature, etc., looked at in the universal aspect of a law of good, is defined by the author as the law of Use, the divine end of the universe put into effect, the law of Service, but of mutual service and not of the service of self. Ethics is the development of the will into harmony with the moral environment which is an

actual objective force operating in the universe by virtue of a Creator and this Creator's purpose, which is the living for other than self, and hence for *mutual service*. The moral law of use or service is thus of divine origin. The theory of the author is that of nearly all logical religions and philosophies, only expressed under different similes and with especial reference to Ruskin. μκρκ.

RELIGION. By *G. de Molinari*. Translated from the second (enlarged) edition, with the author's sanction, by Walter K. Firminger. London: Swan Sonnenschein & Co. New York: Macmillan & Co. 1894. Price 2s. 6d. Pp. 195.

Under the attractive title of the "Philosophy at Home Series" the Messrs. Swan Sonnenschein & Co. have recently published some essays of Schopenhauer's, Lotze's "Outlines of the Philosophy of Religion," E. B. Bax's "The Problem of Reality," Mr. Salter's "First Steps in Philosophy," and A. Lillie's "The Influence of Buddhism on Primitive Christianity." The last number of the series is the present volume of G. de Molinari, who is editor-in-chief of the *Journal des Economistes*, and is well known for his studies of economics. This book is substantially "a plea in favor of the independence and liberty of creeds." M. Molinari, believing that moral forces are the necessary conditions of the prosperity and existence of nations, thinks that religious culture should be freed from material obstacles of all kinds, especially state-conferred privileges and subsidies. The point of view of the work is mainly economical and applies more to the state of things in Europe, where Established Churches exist, than to America. μκρκ.

FRIEDRICH HEINRICH JACOBI, A STUDY IN THE ORIGIN OF GERMAN REALISM. By *Norman Wilde*, Ph. D. Department of Philosophy and Education, Columbia College, New York. May, 1894. Pp., 77. Price, 60 cents.

Mr. Wilde's little book is welcome, as few studies of Jacobi exist in English. Mr. Wilde finds, that although the influence which Jacobi indirectly exercised over Fries, Schleiermacher, and Beneke was great, yet it is rather in the impulse which he gave to the study of psychology that his lasting worth must be recognised. "It "is Jacobi's merit to have recalled philosophy to the study of the inner life. By "insisting on the value of primary beliefs as the ultimate criteria of truth, he makes "necessary the minute study of these facts, and the consequent analysis of con-"sciousness." The pamphlet is the first of the "Columbia College Contributions to Philosophy, Psychology, and Education," which are to appear under the editorship of Professors Butler and Cattell and Doctors Hyslop and Farrand. The series will contain important dissertations submitted for the attainment of the degree of Doctor of Philosophy, technical studies by the professors and instructors, and reprints of contributions made by Columbia men to other journals. The series deserves the consideration and support of philosophical specialists. μ.

DISCUSSIONS.

To the Editor of The Monist:

In the October number of *The Monist*, in an article on "Heredity versus Evolution," by Mr. Theodore Gilman, there occur the following sentences:

"Ribot defines its meaning [that is, of heredity] as 'that biological law by "which all beings endowed with life tend to repeat themselves in their descendants. "It is for the species, what personal identity is for the individual.' Herbert Spen- "cer, carefully following Ribot, defines it as 'the law that each plant or animal "produces others of a like kind with itself.'"

The facts are that the definition of heredity above quoted from Mr. Spencer occurs in the first volume of his "Principles of Biology," § 80, published in 1864. The volume of M. Ribot quoted from,—"L'Hérédité"—was not published until 1873. Obviously, therefore, if there is any indebtedness shown, it cannot be due to the careful "following" of Ribot by Mr. Spencer.

I respectfully send you this note for the next number of *The Monist* in the interest of the commendable exactness referred to by Mr. Gilman in the note printed with his article.

JAMES A. SKILTON.
Corresponding Secretary Brooklyn Ethical Association.

To the Editor of The Monist:

Mr. James A. Skilton, Corresponding Secretary of the Brooklyn Ethical Association, calls attention to a mistake in my article on "Heredity versus Evolution," in *The Monist* of October, 1893, where I say that Herbert Spencer carefully follows Ribot in his definition of heredity, whereas Ribot wrote after and quoted from Spencer.

I had in mind the derivation of the word from the French. My complaint was that Spencer should have been the first to transfer into the English language an important word from the French, where it had been used since the eleventh century, with no comment or explanation, and with a tacit assumption of its acceptance. Since he is silent on the subject of its derivation, he leaves it to others to speculate regarding it.

That Spencer borrowed the word from the French must be accepted as certain. That it came from Lucas (1847) would appear equally so, both because he was the first writer on this special subject, and from his definition "natural heredity, in the "spirit of our definition, embraces the propagation of the forms and elements of "the existence of living beings." This is elaborated in numerous other passages throughout his work.

We may make the same excuse for Mr. Spencer that Professor Weismann does on page 53, Vol. II, of his "Essays on Heredity," where he says: "This hypoth- "esis must have been forgotten later on, or Herbert Spencer would never have "enunciated it and supported it without reference to his predecessors." There is a poetic justice in the fact that the word heredity, which he introduced in this surreptitious manner, should prove a petard, and develop such explosive qualities in connexion with the corner-stone of his entire system.

THEODORE GILMAN.

PERIODICALS.

THE PSYCHOLOGICAL REVIEW. VOL. I. NO. 3.

FREEDOM AND PSYCHO-GENESIS. By *Alexander T. Ormond.*—THE CASE OF JOHN BUNYAN (III). By *Josiah Royce.*—A STUDY OF FEAR AS PRIMITIVE EMOTION. By *Hiram M. Stanley.*—EXPERIMENTS IN SPACE PERCEPTION (I). By *James H. Hyslop.*—PERSONALITY-SUGGESTION. By *J. Mark Baldwin.*—SHORTER CONTRIBUTIONS, DISCUSSION, ETC.—(New York and London: Macmillan & Co.)

The book notices and résumés of technical articles in *The Psychological Review* are good and discriminate. Professor Ormond's article is quite forcible: freedom is teleologically construed, but freedom and self-activity are identified. The result of Professor Stanley's investigation is, "that fear, as indeed every emotion, does not consist of pain or cognition-revivals in any form, but is a feeling reaction from the representation of the feeling potency of the object." Dr. Hyslop's experiments are not yet concluded.

THE PHILOSOPHICAL REVIEW. Vol. III. Nos. 2 and 3.

SOME ANOMALIES IN LOGIC. By *Dr. James H. Hyslop.*—THE THEISTIC ARGUMENT OF SAINT THOMAS. By *Brother Chrysostom.*—GREEN AND HIS CRITICS. By *Prof. H. Haldar.*—GERMAN KANTIAN BIBLIOGRAPHY. By *Dr. Erich Adickes.*

THE TEST OF BELIEF. By *Prof. J. P. Gordy.*—ARE WE "CONSCIOUS AUTOMATA"? By *Prof. James Seth.*—KANT'S RELATION TO UTILITARIANISM. By *Norman Wilde.*—GERMAN KANTIAN BIBLIOGRAPHY. By *Dr. Erich Adickes.* DISCUSSION: THE EGO AS CAUSE. By *Prof. John Dewey.*—BOOK REVIEWS. (Boston, New York, Chicago: Ginn & Co.)

MIND. NEW SERIES, No. 10.

ON THE NATURE OF ÆSTHETIC EMOTION. By *Bernard Bosanquet.*—FREEDOM, RESPONSIBILITY, AND PUNISHMENT. By *James H. Hyslop.*—TIME AND THE HEGELIAN DIALECTIC. By *J. Ellis McTaggart.*—REFLECTIVE CONSCIOUSNESS. By *Shadworth H. Hodgson.*—DISCUSSIONS, ETC. (London and Edinburgh: Williams & Norgate.)

INTERNATIONAL JOURNAL OF ETHICS. Vol. IV. No. 3.

SOME REMARKS ON PUNISHMENT. By *F. H. Bradley.*—OCCULT COMPENSATION. By *Henry C. Lea.*—THE REALITY OF THE GENERAL WILL. By *Bernard Bosanquet.*—THE COMBINATION OF CAPITAL. By *E. Benj. Andrews.*—RELA-

TION OF ETHICAL CULTURE TO RELIGION AND PHILOSOPHY. By *Frederic Harrison* and *Felix Adler*.—"ITALY AND THE PAPACY." By *Francis Archb. Satolli*.—DISCUSSIONS.—BOOK REVIEWS. (Philadelphia: International Journal of Ethics, 118 S. Twelfth Street.)

Professor Adler attempts to reply in this number to the strictures of Mr. Frederic Harrison made in the paper which was read from the great Positivist at the Ethical Congress at Chicago. Mr. Harrison's position, which is well known, is that "the religious and the philosophical problems are really antecedent—must come first; these problems are truly the basis: they govern and determine the ethical problem"; while Professor Adler, whose position is also well known, contends that no previous agreement with respect to religion and philosophy is necessary for members of the ethical societies beyond the desire to increase the knowledge of the right, and that on the simpler, every-day questions of morality a substantial agreement has been reached among good people generally—statements which are very doubtful.

THE JOURNAL OF SPECULATIVE PHILOSOPHY. Vol. XXII. No. 4.

BAUMGART'S INTERPRETATION OF GOETHE'S MÄRCHEN. By *Isaac N. Judson*.—THE SECRET OF KANT. By *Gordon Clark*.—MYSTIC THEOLOGY BY DIONYSIUS AREOPAGITA. By *Thomas Davidson*.—FRIENDSHIP. By *Lenora B. Halsted*.—ARISTOTLE'S DOCTRINE OF REASON. By *W. T. Harris*.—A GLIMPSE INTO PLATO. By *Florence James Williams*.—KNOWLEDGE AND BELIEF REGARDING IMMORTALITY. By *W. Lutoslawski*. (New York: D. Appleton & Co.)

This is the first number of the *Journal of Speculative Philosophy* which has appeared since September, 1892.

VIERTELJAHRSSCHRIFT FÜR WISSENSCHAFTLICHE PHILOSOPHIE. Vol. XVIII. No. 2.

BEMERKUNGEN ZUM BEGRIFF DES GEGENSTANDES DER PSYCHOLOGIE. (First Article.) By *R. Avenarius*.—GLAUBE UND URTHEIL. By *W. Jerusalem*.—EINIGES ZUR GRUNDLEGUNG DER SITTENLEHRE. (Third Article. Concluded.) By *J. Petzoldt*. (Leipsic: O. R. Reisland.)

PHILOSOPHISCHE MONATSHEFTE. Vol. XXX. Nos. 1 and 2.

DIE NATÜRLICHE WELTANSICHT. By *W. Schuppe*.—THEORIE DER TYPEN-EINTHEILUNGEN. By *B. Erdmann*.—IN SACHEN DER TRIEBLEHRE. By *J. Duboc*.—EIN BISHER NOCH UNENTDECKTER ZUSAMMENHANG KANTS MIT SCHILLER. By *K. Vorländer*.—RECENSIONEN. (Berlin: Georg Reimer.)

After October 1, the *Philosophische Monatshefte*, then ending their thirtieth year, will be amalgamated with the *Archiv für Geschichte der Philosophie*, to form a composite magazine that will treat collectively of systematic and historical philosophy, and will bear the title of *Archiv für Philosophie*. The *Archiv für Geschichte der Philosophie* will be conducted as before and bear the same name. The *Philosophische Monatshefte*, which will cover the systematic department, will have the title *Archiv für systematische Philosophie*. A noteworthy feature of this branch of the new magazine will be the annual reports of the philosophical literature of all countries written in the languages of those countries. Also contributions in English, French, and Italian will be received. The reports will be furnished by Prof. Paul Natorp for epistemology, Prof. Rudolph Eucken for metaphysics, Prof. Benno

Erdmann for psychology, Prof. Aloys Riehl for logic, Prof. Friedrich Jodl for ethics, Prof. Ferdinand Tönnies for sociology, Prof. Rudolf Stammler for philosophy of law, Prof. Theodor Lipps for æsthetics, Prof. August Baur for the philosophy of religion, and Prof. Dr. Theobald Ziegler for pedagogics. The editors are: Hermann Diels, Wilhelm Dilthey, Benno Erdmann, Paul Natorp, Christoph Sigwart, Ludwig Stein, and Eduard Zeller.

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. Vol. VII. Nos. 1.

FUNKTION UND FUNKTIONSENTWICKELUNG DER BOGENGÄNGE. By *Karl L. Schaefer.*—DER UMFANG DES GEHÖRS IN DEN VERSCHIEDENEN LEBENSJAHREN. By *Dr. H. Zwaardemaker.*—STUDIE ZUR ERKLÄRUNG GEWISSER SCHEINBEWEGUNGEN. By *Dr. Julius Hoppe.*—LITTERATURBERICHT. (Hamburg and Leipsic: Leopold Voss.)

ZEITSCHRIFT FÜR PHILOSOPHIE UND PHILOSOPHISCHE KRITIK Vol. CIV. No. 1.

UEBER DIE LETZTEN FRAGEN DER ERKENNTNISTHEORIE UND DEN GEGENSATZ DES TRANSCENDENTALEN IDEALISMUS UND REALISMUS. (Second Article.) By *Dr. Edm. Koenig.*—DIE PHILOSOPHIE IN RUSSLAND. By *Jakob Kolubowsky.*—JAHRESBERICHT ÜBER ERSCHEINUNGEN DER ANGLO-AMERIKANISCHEN LITTERATUR AUS DER ZEIT VON 1891–1892. By *Friedrich Jodl.*—RECENSIONEN. (Leipsic: C. E. M. Pfeffer.)

REVUE PHILOSOPHIQUE. Vol. XIX. Nos. 3, 4, and 5.

RECHERCHES SUR LES RAPPORTS DE LA SENSIBILITÉ ET DE L'ÉMOTION. By *P. Sollier.*—LA SANCTION MORALE. By *F. Paulhan.*—DEUX NOUVEAUX HISTORIENS DE DESCARTES. By *F. Bouillier.*

L'ANCIENNE ET LES NOUVELLES GÉOMÉTRIES. II. LES NOUVELLES GÉOMÉTRIES ONT LEUR POINT D'ATTACHE DANS LA GÉOMÉTRIE EUCLIDIENNE. By *J. Delbœuf.*—LE PROBLÈME DU MONISME DANS LA PHILOSOPHIE DU TEMPS PRÉSENT. By *E. de Roberty.*—LA SANCTION MORALE. (Concluded.) By *F. Paulhan.*

LES RÈGLES DE LA MÉTHODE SOCIOLOGIQUE. (First Article.) By *Durkheim.*—LE SENTIMENT ET L'ANALYSE. By *Rauh.*—SUR DIVERSES ACCEPTIONS DU MOT LOI DANS LES SCIENCES ET EN MÉTAPHYSIQUE. By *L. Weber.*—DESCARTES ET LES DOCTRINES CONTEMPORAINES By *A. Fouillée.* (Paris: Félix Alcan.)

In the March number, M. Paulhan gives us an interesting review of M. Durand's work *Le merveilleux scientifique*, and M. Bouillier subjects to a critical examination the views of two new historians of Descartes, M. Brunetière and M. Fouillée. In the April number M. Delbœuf continues the interesting series on the New and Old Geometries. His essays are deserving of special attention at the hands of philosophers.

REVUE DE MÉTAPHYSIQUE ET DE MORALE. Vol. II. No. 2

LA DIVISIBILITÉ DANS LA GRANDEUR: GRANDEUR ET NOMBRE. By *F. Evellin.*—LA VALEUR POSITIVE DE LA PSYCHOLOGIE. By *G. Remacle.*—DEUXIÈME DIALOGUE PHILOSOPHIQUE ENTRE EUDOXE ET ARISTE. By *Criton.*—DISCUSSIONS. (Paris: Librairie Hachette & Co.)

APPENDIX TO "THE MONIST," VOL. 4, NO. 3.

THE

DAWN OF A NEW RELIGIOUS ERA

BY

DR. PAUL CARUS

CHICAGO
THE OPEN COURT PUBLISHING COMPANY

[This article, written immediately upon the close of the Parliament of Religions in September '93, at the solicitation of Mr. Walter H. Page, editor of *The Forum*, appeared in the November number of that magazine. It is here republished with the courteous permission of the Forum Publishing Company as representing the editorial views of *The Monist*.]

THE DAWN OF A NEW RELIGIOUS ERA.

THE Parliament of Religions, which sat in Chicago from September 11 to September 27, was a great surprise to the world. When the men who inaugurated it invited representatives of all the great religions of the earth to meet in conference, their plan was looked upon with misgiving, if not with ridicule. The feasibility and the advisability of their undertaking were doubted. The greatest and most powerful churches, it was said, would not be represented. The Vatican, for instance, regards the Roman Catholic Church as the only soul-saving power, with exclusive authority to loose or bind. To allow a comparison between it and other churches on a footing of equality, to appeal to reason, to provoke and favor such an appeal, or to submit to a decision after argument, would be tantamount to the recognition of reason, or logic, or science, as a higher and the highest test of truth. Like reasons, it was thought, would more or less influence other denominations, for almost all of them claim to be based upon a special divine revelation which is above argument, so as to render the mere doubt of it sin.

In spite of all these doubts and fears, the Parliament of Religions was convened, and it proved an ex-

traordinary success. The work grew rapidly under the hands of its promoters, so that the time originally alloted to it had to be increased until it extended over seventeen days. Although discussion had been excluded from the programme so as to avoid friction, it could not be entirely controlled. Nevertheless a good spirit presided over all the sessions, so that criticism promoted a closer agreement and united men of different faiths more strongly in bonds of mutual respect and toleration. The multitudes that filled the halls at the closing session were animated with a feeling that the Parliament had not lasted long enough, that a movement had been inaugurated which was as yet only a beginning that needed further development, and that we should stay and continue the work, until the mustard-seed we were planting should become a tree under whose branches the birds of the heavens might find a dwelling-place.

The idea of holding a parliament of religions is not new. It was proposed and attempted on a smaller basis in former times by Asiatic rulers. It has been predicted and longed for by men of different races and various religions. Of European authors we may mention Volney who in his "Ruins" describes minutely how "men of every race and every region, the European in his short coat, the Asiatic in his flowing robes, the African with ebony skin, the Chinese dressed in silk, assemble in an allotted place to form a great religious congress."

It is certain that similar ideas have stirred the hearts of many. The Shinto High Priest of the Japanese State Church, the Rt. Rev. Reuchi Shibata in one of his speeches said: "Fourteen years ago I expressed in my own country the hope that there would be a

friendly meeting of the world's religionists, and now I realise my hope with great joy in being able to attend this phenomenal congress."

It is but natural that this sentiment should prevail in Japan where three religions, which closely considered are by no means compatible, exist peacefully side by side. The ancient nature worship of Shinto was not exterminated when the doctrines of Confucius were preached and accepted, and the Buddhists wage no war on either. Many families of Japan conform to the official ceremonies of Shinto; they even respect its popular superstitions, and have their children taught the precepts of the great Chinese sage as set forth in the book of rites and other sacred writings, while they themselves seek consolation for the deeper yearnings of their souls in the wisdom of Buddha. There are for these three religions shrines side by side in their homes and in their hearts.

All uncertainty as to the feasibility of the gathering vanished when the Roman Catholic Church most cordially accepted the invitation to take part. "We, as the mother of all Christian churches," said Bishop Keane, in his extemporaneous and unpublished farewell address, "have a good right to be represented. Why should we not come?" And nearly all the other denominational representatives thought as he did. Whether or not it was consistent with traditional orthodoxy, they came none the less. So powerful was the desire for a religious union, representatives of the broadest as well as of the narrowest views met in fraternal co-operation on the same platform. You could see such an evangelist as Joseph Cook sitting by the side of liberal clergymen, such as Jenkin Lloyd Jones, of Chicago, and E. L. Rexford, of Boston. And these

Christians again exchanged cordial greetings with the pagan Hindus and the atheistic Buddhists; an unprecedented spectacle!

And it was a spectacle in the literal sense of the word. In accord with American simplicity, the men of this country appeared in their every-day attire and our European guests wisely followed their example. Nevertheless, the sight was often picturesque. Cardinal Gibbons, when he delivered the prayer at the opening of the first public session, wore his official crimson robes. The prelates of the Greek Church, foremost among them the Most Rev. Dionysios Latas, Archbishop of Zante, looked very venerable in their sombre vestments and Greek cylindrical hats. The Shinto High Priest Shibata was dressed in a flowing garment of white, decorated with curious emblems, and on his head was a strangely-shaped cap wrought apparently of black jet, from the top of which nodded mysteriously a feather-like ornament of unknown significance. Pung Quang Yu, a tall and stout man, an adherent of Confucius, and the authorised representative of the Celestial Empire, appeared in Chinese dress. There were present several Buddhist bishops of Japan, in dress which varied from violet to black. The turbaned Hindu monk, Swami Vivekananda, in a long, orange gown, who, as we were informed, lived in voluntary poverty so that as a rule he did not know where he would receive his next day's meal; Dharmapâla, the Ceylonese Buddhist, in his robe of white;—these and many more were the exceedingly interesting men who appeared upon the stage and spoke their minds freely on subjects over which in former ages cruel wars were waged. Differences not only of religious opinions but also of races were represented in

the Congress. Bishop B. W. Arnet, of the African Methodist Episcopal Church, confessed that the brotherhood of man had for the first time been taken seriously. When introduced, he said, "I am to represent the African, and have been invited to give color to the Parliament of Religions." Interrupted by a storm of merriment, he continued, "But I think the Parliament is already very well colored, and if I have eyes, I think the color is this time in the majority."

The Parliament of Religion was, I repeat, a great spectacle; but it was more than that. There was a purport in it. It powerfully manifested the various religious yearnings of the human heart, and all these yearnings exhibited a longing for unity and mutual good understanding. How greatly they mistake who declare that mankind is drifting toward an irreligious future! It is true that people have become indifferent about theological subtleties, but they still remain and will remain under the sway of religion; and the churches are becoming more truly religious, as they are becoming less sectarian.

There are two kinds of Christianity. One is love and charity; it wants the truth brought out and desires to see it practically applied in daily life. It is animated by the spirit of Jesus and tends to broaden the minds of men. The other is pervaded with exclusiveness and bigotry; it does not aspire through Christ to the truth; but takes Christ, as tradition has shaped his life and doctrines, to be the truth itself. It naturally lacks charity and hinders the spiritual growth of men. The latter kind of Christianity has always been looked upon as the orthodox and the only true Christianity. It has been fortified by Bible passages, formulated in Quicunques, indorsed by decisions of œcumenical councils

and by papal bulls. Tracts privately distributed among the visitors to the Congress contained quotations such as, "Though we or an angel from heaven preach any other Gospel unto you than that we have preached unto you, let him be accursed"; and "He that believeth not shall be condemned." Without using the same harsh terms, Saint Peter expressed himself not less strongly, in a speech before the Jews concerning Jesus of Nazareth, saying: "Neither is there salvation in any other: for there is none other name under the heaven given among men whereby we must be saved."

There were a few voices heard at the Parliament of Religions which breathed this narrow and so-called orthodox Christianity, but they could hardly be regarded as characterising the spirit of the whole enterprise. They really served as a contrast by which the tolerant principles of our Oriental guests shone the more brightly. "The Hindu fanatic," said Vivekananda, "burns himself on the pyre, but he never lights the fagots of an Inquisition"; and we were told that Buddha said to his disciples, "I forbid you to believe anything simply because I said it." Even Mohammedanism, generally supposed to be the most authoritative of all religions, appeared mild and rational as explained by Mohammed Alexander Russell Webb. Mr. Webb said: "The day of blind belief has passed away. Intelligent humanity wants a reason for every belief, and I say that that spirit is commendable and should be encouraged, and it is one of the prominent features of the spirit of Islam." At one of the meetings a prayer was offered for those blind heathen who attended the Congress, that God might have mercy on them and open their eyes, so that they would see their own errors and accept the truth of Christianity; but

the prayer, made in the spirit of the old bigoted Christianity which believes in the letter and loses the spirit, found an echo neither in the hearts of our foreign guests nor among the men who had convened the Congress nor among the audience who listened to the prayer. Far from being converted, the heathen delegates took the opportunity of denouncing Christian missionaries for their supercilious attitude and for making unessential things essential. For instance, the missionaries, they said, demand that the Hindus abolish caste, and treat the refusal to eat meat as a pagan prejudice, so that in the Hindu mind "Christian" has come to mean "carnivorous." One of the delegates, a Brahman layman, said: "With the conqueror's pride they cannot bring themselves down, or rather cannot bring themselves up to practise the humility which they preach." B. B. Nagarkar, of Bombay, expressed himself more guardedly. Said he:

"Sad will be the day for India when Christian missionaries cease to come; for we have much to learn about Christ and Christian civilisation. They do some good work. But if converts are the measures of their success, we have to say that their work is a failure. Little do you dream that your money is expended in spreading abroad nothing but Christian dogmatism, Christian bigotry, Christian pride, and Christian exclusiveness. I entreat you to expend one-tenth only of your vast sacrifices in sending out to our country unsectarian, broad missionaries who will devote their energy to educating our men and women. Educated men will understand Christ better than those whom you convert to the narrow creed of some cant Christianity."

The severest rebuke came from the lips of the representative of Jainism, and from the monk Vivekananda. The latter denounced Christian missionaries for offering stones instead of bread. They build churches, he said, and preach sectarian creeds which

benefit no one. They despise the sacred traditions of the Hindu, the profundity of which they are unable to fathom; and, he added, "What shall we think of a religion whose missionaries distribute food in a famine to the starving people on the condition of conversion?"

These were hard reproaches, yet they were accepted by the Christians with good grace.* The Rev. R. G. Hume of India said, "We are willing to have our Bud-

* This passage was much commented upon in various newspapers and religious journals, and it appears that the writer's attitude has been misunderstood.

That several hard reproaches "were accepted by the Christians with good grace" is not a slight, not a rebuke, but a praise. It is very doubtful whether a Mohammedan or any other but a Christian audience would have been so patient as to listen good-naturedly to similar censures. Forbearance is always a symptom of strength. None but the strong can afford to be generous and tolerant. Compare p. 18, lines 13–18 of this article.

Among the comments that came to our notice the *National Baptist* of November 23 discusses Vivekananda's statement under the caption, "A False Accusation." Dr. S. W. Duncan writes: "I hope Bishop Keane's denunciation was honest and not a covert fling at Protestants.... I suspect if the Hindu monk had told the whole truth, all he knew, he would have been compelled to mention by name Roman Catholics. Dr. Bunker has recently given me instances of his being frustrated in his work by Catholic priests preceding him in heathen villages, and buying up the chiefs, giving them money and other considerations of weight with heathen, for their acceptance of crucifixes and Romish rites and enrollment as Catholics. I have made inquiry, and there is not on record a single intimation that any one of our missionaries has ever thus abused his holy calling."

We have a good opinion of Baptist missions, and know at the same time that Roman Catholic missionaries, among them the much-reviled Jesuits, have shown an admirable devotion to the cause of their religion.

Supposing Vivekananda's accusation to be true of some Christian missionaries, we do not take it to mean a wholesale condemnation of all. Nor do we wish to pour cold water upon the missionary zeal. The missionary spirit is the index of the spiritual life of a religion, and we are glad to see it in Buddhists not less than in Christians. But we are sorry that the broad religious spirit which pervaded the Parliament and is present among the Unitarians and other liberal institutions, is too weak to undertake any great propaganda for their cause. How much more effective would Christian missionaries be if they taught religion instead of dogmas, and love of truth instead of blind faith.

The Louisville Record of November 30 calls Vivekananda's statement slander, and adds: "When will we get over the harm done by the World's Parliament of Religions?" This reminds us of the parable of the sower, where Christ says: "Some [seeds] fell upon stony ground."

dhistic and Brahman friends tell us how we can do better. Any one who will help us to be more humble and more wise will do us good and we will thank him whoever he be." And Bishop Keane, Rector of the Roman Catholic University at Washington, was not lacking in this broad religious spirit. "I indorse," said the Bishop, impressively, "the denunciation hurled against the system of pretended charity that offered food to the hungry Hindus at the cost of their conscience and their faith. It is a shame and disgrace to all who call themselves Christians. And if Vivekananda by his criticism can only stir us and sting us into better teachings and better doings in the great work of Christ, I for one shall be profoundly grateful to our friend the great Hindu monk."

This is the true catholicity of the religion of mankind, and coming from the lips of a Roman Catholic bishop, it did not fail to find a joyous and powerful response in the audience. To the honor of our Hindu friends we have to add that the fairness and impartial love of justice with which their remarks were accepted by a Christian audience, as well as by their Christian brethren on the platform, were unhesitatingly recognised. Said one of them, "The tolerance, the kindliness, nay, the patience with which you listen to the enumeration of your faults, this sympathy with the wrong done to heathendom by Christianity, makes me believe that we have all advanced and are advancing wonderfully."

Heretofore, the broad Christianity has always been regarded as heretical; but as this Parliament proves, times have changed. Judging from what we witnessed at Chicago, the official representatives of almost all religions speak a new language. The narrowness of past

ages is now felt to be due to imperfect views of the truth, and we recognise the duty to pass beyond it to a higher and grander conception. There are still representatives of the narrow spirit left, but their position becomes more and more untenable. What does it matter that previous œcumenical councils did not stand upon a broad platform? Does not religion grow? Was the present Parliament of Religions not œcumenical? And has the holy spirit of religious progress ceased to be a presence in mankind? If ever any council was œcumenical, it was this gathering at Chicago; and although no resolutions were passed, there were a certain harmony in matters of faith and a consciousness of that which is essential, such as were never manifested before.

The narrow Christianity will disappear, for its errors have become palpable. There are still remaining some prophets of the trust in a blind faith, but their influence is on the wane. Liberals are inclined to suspect the motives of the believers in the letter, but they judge without charity. The narrow-minded Christian dogmatists are neither false nor hypocritical, for we have ample evidence of their earnestness and their simple-minded piety. Yet they are mistaken. They are deficient in insight and they lack in understanding. We shall have to educate them and teach them that the gentle spirit of Christ is not with them, but marches on with the progressive part of mankind to the planes of a higher evolution.

We all of us have learned much during these congresses. Our foreign guests have learned to know Christianity better than it appeared to them in the conduct of Christians and in sermons and Sunday-schools, and we in turn have learned to respect not only the

love of truth and earnestness of pagans, but also their philosophical capacity.

The narrow Christianity was represented by a few speakers and the audience endured them with great patience; but we can fairly ignore them here; for there is no need of reviewing or recapitulating sermons which every one who desires can enjoy in our various orthodox churches. Dr. Briggs represented progressive theology and insisted that religion must face the criticism of science. The Rev. Mr. Mozoomdar is the leader of a similar movement in India. The Brahmo Somaj, which he and the able Secretary of the Association, Mr. B. B. Nagarkar of Bombay, represented, may be characterised as Hindu Unitarianism. Max Müller and Henry Drummond sent brief papers which showed the warm sympathy of the authors and their substantial agreement with the spirit of the Parliament of Religions.

It is impossible to analyse the details of the various views presented; but a few quotations from the speeches of our heathen friends whom we had not the pleasure of meeting before, will not be out of place.

Vivekananda explained the central idea of the Vedas as follows:

"I humbly beg to differ from those who see in monotheism, in the recognition of a personal God apart from nature, the acme of intellectual development. I believe it is only a kind of anthropomorphism which the human mind stumbles upon in its first efforts to understand the unknown. The ultimate satisfaction of human reason and emotion lies in the realisation of that universal essence which is the All. And I hold an irrefragable evidence that this idea is present in the Veda, the numerous gods and their invocations notwithstanding. This idea of the formless All, the Sat, i. e., *esse*, or Being called Âtman and Brahman in the Upanishads, and further explained in the Darsanas, is the central idea of the Veda, nay, the root idea of the Hindu religion in general."

On another occasion the same speaker dwelt on the idea of this panentheism with reference to the soul. Though recognising law in the world, he repudiated materialism. The soul has tendencies, he said, and these tendencies have been caused by past actions in former incarnations. Science explains everything by habits, and habits are acquired by repetition. That we do not remember the acts done in our previous states of existence is due to the fact that consciousness is the surface only of the mental ocean, and our past experiences are stored in its depths. The wheel of causation rushes on, crushing everything in its way, and waits not for the widow's tear or the orphan's cry. Yet there is consolation and hope in the idea that the soul is immortal and we are children of eternal bliss. The Hindu refuses to call men sinners; he calls them "children of immortal bliss." Death means only a change of centre from one body to another. He continued:

"The Vedas proclaim, not a dreadful combination of unforgiving laws, not an endless prison of cause and effect, but that, at the head of all these laws, in and through every particle of matter and force, stands One through whose command the wind blows, the fire burns, the clouds rain, and death stalks upon the earth. And what is his nature? He is everywhere, the pure and formless one, the Almighty and the All-merciful. 'Thou art our Father, thou art our mother, thou art our beloved friend, thou art the source of all strength. Thou art He that beareth the burdens of the universe: help me bear the little burden of this life.' Thus sang the Rishis of the Veda. And how to worship him? Through love. 'He is to be worshipped as the one beloved, dearer than everything in this and in the next life.'"

The breadth of Vivekananda's religious views appeared when he said:

"The same light shines through all colors, and in the heart of everything the same truth reigns. The Lord has declared to the

Hindu in his incarnation as Krishna, 'I am in every religion, as the thread through a string of pearls, and wherever thou seest extraordinary holiness and extraordinary power raising and purifying humanity know ye that I am there."

Parseeism, the noble religion of Zarathustra, received scholarly treatment by Jinanji Jamshedji Modi who repudiated its dualism and represented it as pure monotheism, while he satisfactorily explained the symbolism of the sacred fire. In this way almost every religion was raised to a higher standpoint, than it is usually understood to have, by its representatives, and even idolatry found adroit champions in the Congress.

Said Vivekananda:

"It may be said without the least fear of contradiction that no Indian idolator, as such, believes the piece of stone, metal, or wood before his eyes to be his god in any sense of the word. He takes it only as a symbol of the all-pervading Godhood, and uses it as a convenient object for purposes of concentration, which being accomplished, he does not hesitate to throw it away."

Prince Momolu Massaquoi, son of a native king from the Wey Territory of the West Coast of Africa, a fine-looking youth of good education, which he had received in an American college after his conversion to Christianity, spoke in the same way with Vivekananda concerning the idolatry of African natives.

Mohammedanism, in addition to its representation by Moslems, was critically reviewed by the Rev. George Washburn, President of Robert College, Constantinople, who showed its points of contact and disagreement with Christianity. He quoted passages from the Koran which, in contrast to Mr. Webb's exposition, prove the exclusiveness of Mohammed's religion. The third sura, for instance, declares:

"Whoever followeth any other religion than Islam, shall not be accepted, and at the last day he shall be of those that perish!"

Dr. Washburn's quotation from the Koran reminds us of similar passages in the New Testament; the old orthodoxy of the Moslems, however, is giving way to broader views. *Tout comme chez nous!* Dr. Washburn quoted the following Mohammedan hymn, composed by Shereef Hanoom, a Turkish lady of Constantinople, and translated by the Rev. H. O. Dwight, which reminds us strongly of our best modern Christian poetry:

"O source of kindness and of love,
O give us aid or hopes above,
'Mid grief and guilt although I grope,
From thee I'll ne'er cut off my hope,
My Lord, O my Lord!

"Thou King of Kings, dost know my need,
Thy pardoning grace, no bars can heed;
Thou lov'st to help the helpless one
And bid'st his cries of fear be gone,
My Lord, O my Lord!

"Shouldst thou refuse to still my fears,
Who else will stop to dry my tears?
For I am guilty, guilty still,
No other one has done so ill,
My Lord, O my Lord!

"The lost in torment stand aghast,
To see this rebel's sins so vast;
What wonder, then, that Shereef cries
For mercy, mercy, ere she dies,
My Lord, O my Lord!"

Prof. Minas Tchéraz, an Armenian Christian, when sketching the history of the Armenian Church, said sarcastically that real Mohammedanism was quite different from the Islam represented by Mr. Webb. This may be true, but Mr. Webb might return the compliment and say that true Christianity as it showed itself in deeds such as the Crusades, is quite different from

that ideal which its admirers claim it to be. Similar objections, that the policy of Christian nations showed very little the love and meekness of Jesus, were indeed made by Mr. Hirai, a Buddhist of Japan. We Christians have reason enough to be charitable in judging others.

Buddhism was strongly represented by delegates from Ceylon, Siam, and Japan. H. R. H. Chandradat Chudhadharn, Prince of Siam, sent a paper which contained a brief exposition of Buddhistic principles. There are four noble truths according to Buddha. These are (1) the existence of suffering; (2) the recognition of ignorance as the cause of suffering; (3) the extinction of suffering by the cessation of the three kinds of lust arising from ignorance; and (4) the eight paths that lead to the cessation of lust. These eight paths constitute the way of salvation and are (1) right understanding; (2) right resolutions; (3) right speech; (4) right acts; (5) the right way of earning a livelihood; (6) right efforts; (7) right meditation; and (8) the right state of the mind. The Japanese Buddhists are men of philosophical depth and genius, and might have made a deeper impression than they did if they had been more familiar with Western thought. They left, however, behind them a number of pamphlets for free distribution by the Bukkyo Gakkuwai, a society at Tokio whose sole purpose is the propagation of Buddhism.* The missionary zeal of the Japa-

* These are the titles of the Japanese missionary tracts in my possession: *Outlines of the Makâyâna as taught by Buddha*, by S. Kuroda, Superintendent of Education of the Jôdo-Sect; *The Sutra of Forty-two Sections and Two Other Short Sutras*, translated from the Chinese originals (The Buddhist Propagation Society: Kyoto, Japan, 1892); *A Shin-Shiu Catechism*, by S. Kato of the Hongwanjiha of the Shin-Shiu sect of Japan (The Buddhist Propagation Society, Kyoto, Japan, 1893); *The Skeleton of a Philosophy of Religion*, by the Rev. Prof. M. Tokunaga, translated by Zenshiro Noguchi (Tokio, Kawai Bunkodo

nese Buddhists shows that there is life in Buddhism. The Rt. Rev. Ashitsu concluded his article on the teachings of Buddha with the following words:

"You know very well that our sunrise island of Japan is noted for its beautiful cherry-tree flowers. But you do not know that our country is also the kingdom where the flowers of truth are blooming in great beauty and profusion at all seasons. Visit Japan, and do not forget to take home with you the truth of Buddhism. All hail the glorious spiritual spring-day, when the song and odor of truth invite you all out to our country for the search of holy paradise!"

One quotation from the Japanese missionary tracts will suffice to prove that the ancient teachings of Gautama are still preserved among his adherents of the present generation of Japan. In "The Sutra of Forty-two Sections" we read on page 3:

"Buddha said: If a man foolishly does me wrong, I will return to him the protection of my ungrudging love. The more evil comes from him, the more good shall go from me. The fragrance of goodness always comes to me, and the harmful air of evil goes to him. . . .

"Buddha said: A wicked man who reproaches a virtuous one is like one who looks up and spits at heaven; the spittle soils not the heaven, but comes back and defiles his own person. So again, he is like one who flings dust at another when the wind is contrary, the dust will return to him who threw it. The virtuous man cannot be hurt, and the misery that the other would inflict falls back on himself."

The Parliament of Religions is undoubtedly the most noteworthy event of this decade. What are the World's Fair and its magnificent splendor in comparison with it? Or what the German Army Bill, the Irish

& Co., 1893); *Outlines of the Doctrine of the Nichiren Sect*, by Nissatsu Arai, the lately lamented Dai-sōjō. With the life of Nichiren, the founder of the Nichiren Sect, edited by the Central Office of the Nichiren Sect, Tokio, Japan, A. D. 1893.

Home Rule Bill in England and its drastic episodes in the House of Parliament, or a change of party in the United States? It is evident that from its date we shall have to begin a new era in the evolution of man's religious life.

It is difficult to understand the pentecost of Christianity which took place after the departure of Christ from his disciples. But this Parliament of Religions was analogous in many respects, and it may give us an idea of what happened at Jerusalem nearly two thousand years ago. A holy intoxication overcame the speakers as well as the audience; and no one can conceive how impressive the whole proceeding was, unless he himself saw the eager faces of the people and imbibed the enthusiasm that enraptured the multitudes.

Any one who attended these congresses must have felt the thrill of the divine spirit that was moving through the minds of the congregation. We may rest assured that the event is greater than its promoters ever dreamed of. They builded better than they knew. How small are we mortal men who took an active part in the Parliament in comparison with the movement which it inaugurated! And this movement indicates the extinction of the old narrowness and the beginning of a new era of broader and higher religious life.

It is proposed that another Parliament of Religions be convened in the year 1900 at the ancient city of Bombay, where we may find a spiritual contrast between the youngest city and the oldest, and pay a tribute from the daughter to the mother. Other appropriate places for Religious Parliaments would be Jerusalem, the Holy City of three great religions, or some port of Japan where Shintoism, Confucianism, Buddhism, and Christianity peacefully develop side by

side, exhibiting conditions which invite a comparison fair to all?

Whether or not the Parliament of Religions be repeated, whether or not its work will be continued,* the fact remains that this congress at Chicago will exert a lasting influence upon the religious intelligence of mankind. It has stirred the spirits, stimulated mental growth, and given direction to man's further evolution. It is by no means an agnostic movement, for it is carried on the wings of a religious faith and positive certainty. It is decidedly a child of the old religions, and Christianity is undoubtedly still the leading star. That the faults of Christianity have been more severely rebuked than those of any other religion should not be interpreted to mean that the others are in every respect better, for the censure is but a sign that points to the purification of Christianity. The dross is discarded, but the gold will remain.

The religion of the future, as the opinions presented indicate, will be that religion which can rid itself of all narrowness, of all demand for blind subordination, of the sectarian spirit, and of the Phariseeism which takes it for granted that its own devotees alone are good and holy, while the virtues of others are but polished vices. The religion of the future cannot be a creed upon which the scientist must turn his back, because it is irreconcilable with the principles of science. Religion must be in perfect accord with science; for

*It may be well to add, and those who are interested in the religious development of mankind may be glad to know, that the work of the Parliament of Religions may be continued. Under Mr. Bonney's direction a local committee has been formed among the members of which are Dr. Thomas, Dr. Gilbert, Dr. Dellano, Mr. M. M. Snell, Mrs. Harbert, and the writer of this article. The committee is in connexion with advisory councils all over the world, and it has been decided to name the new movement "The World's Religious Parliament Extension."

science—and I mean here not the private opinions and hypotheses of single scientists—is not an enterprise of human frailty. Science is divine, and the truth of science is a revelation of God. Through science God speaks to us; by science he shows us the glory of his works; and in science he teaches us his will.*

"We love science," said a Catholic priest, of Paris, at one of the sessions in the scientific section, when protesting against a thoughtless remark of a speaker who broadly accused the clergy of being opposed to science. "We love science," Father D'Arby said, emphatically; "the office of science in religion is to prune it of fantastic outgrowths. Without science religion would become superstition."

The human soul consists of two elements, self and truth. Self is the egotistical desire of being some independent little deity, and truth is the religious longing for making our soul a dwelling-place of God. The existence of self is an illusion; and there is no wrong in this world, no vice, no sin except what flows from the assertion of self. Truth has a wonderful peculiarity: it is inexhaustible, and it, likewise, demands a constantly renewed application. An increase of knowledge involves always an increase of problems that entice the inquiring mind to penetrate deeper and deeper into the mysteries of being, and however serious and truth-loving we may have been, there is always occasion to be more faithful in the attendance to our obligations and daily duties. Self shrivels our hearts; truth makes them expand; and the ultimate aim of re-

* This view of a religion of science was presented by the writer before the Parliament in an address entitled *Science a Religious Revelation* (published in pamphlet form by the Open Court Publishing Co.)

ligion is to eliminate self and let man become an embodiment of truth, an incarnation of God.

We must welcome the light from whatever source it comes, and we must hail the truth wherever we find it. There is but one religion, the religion of truth. There is but one piety, it is the love of truth. There is but one morality, it is the earnest desire of leading a life of truth. And the religion of the future can only be the Religion of Truth.

VOL. 4, No. 4. JULY, 1894.

THE MONIST

A QUARTERLY MAGAZINE.

Editor: DR. PAUL CARUS. *Associates:* EDWARD C. HEGELER. MARY CARUS.

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CHICAGO:

THE OPEN COURT PUBLISHING CO.

London: WATTS & CO., 17 Johnson's Court, Fleet St. E. C.

Price, 50 cts.; Yearly, $2.00. In England and U. P. U., 2s 6d; Yearly, 9s 6d.

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THE MONIST.

A Quarterly Magazine of Philosophy, Religion, Science, and Sociology

PUBLISHED BY

THE OPEN COURT PUBLISHING COMPANY,

MONON BUILDING, 324 DEARBORN STREET, CHICAGO, ILL.

POST OFFICE DRAWER F.

AGENTS AND TERMS OF SUBSCRIPTION.

LONDON: Watts & Co., 17 Johnson's Court, Fleet St., E. C.	Single Copies,	2s. 6d.	Yearly, 9s. 6d.
PARIS: Brentano's, 17 Avenue de l'Opera		fr. 3	fr. 12
LEIPSIC.		Mk. 2.50	Mk. 9.50
ROTTERDAM: H. A. Kramers & Son		—	Fl. 6.60
TURIN: / PALERMO: Libreria Carlo Clausen		—	Lire 12
NEW YORK: / WASHINGTON: Brentano's, 5 Union Square / 1015 Pennsylvania Ave.		50 cents	$2.00
BOSTON: Damrell & Upham, 283 Washington St.			

Postpaid to New South Wales, Victoria, Queensland, Tasmania and New Zealand, and all countries in U. P. U., for one year, $2.25.

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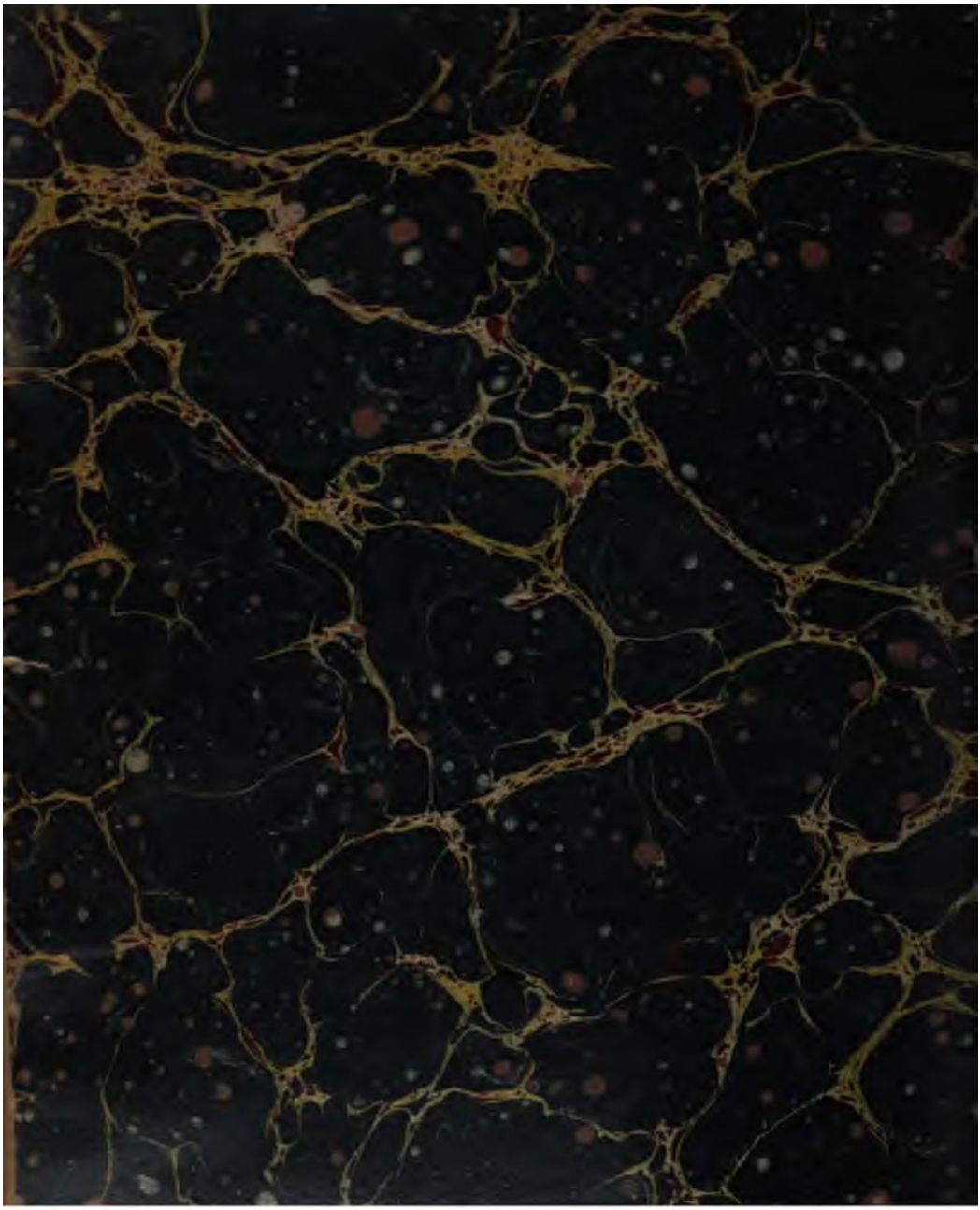

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